UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
Geneva

E-COMMERCE AND DEVELOPMENT REPORT, 2002

UNITED NATIONS
New York and Geneva, 2002

Chapter 1

E-COMMERCE AROUND THE WORLD: A BRIEF STATUS REPORT

Since the E-Commerce and Development Report 2001 was issued last November, the United States, the world's largest e-commerce market, has experienced a mild recession. The performance of the other major developed economies has been poorer than expected and several emerging-market economies in East Asia and Latin America have had negative growth rates. Global economic growth in 2001 fell to 1.3 per cent, as against 3.8 per cent in 2000. The rate of growth of international trade also slowed down significantly. In particular, the exports of developing countries, which had grown at a rate of 14 per cent in 2000, grew by only 1 per cent in 2001.[1]

When the evolution of global e-commerce in 2001 is assessed, this less than bright macroeconomic picture must be considered alongside the effects of the crisis in the dotcom industry and the fall in information technology (IT) spending in several important markets. For example, 2001 was the first year since 1985 in which worldwide personal computer (PC) shipments decreased. Against this background, the fact that the number of hosts networked in the Internet, the number of people using the latter around the world and the value of goods and services traded online keep growing at a rapid pace seems to confirm the view that the changes effected by the Internet in business, government and many other aspects of society stem from long-term considerations.

A. Global connectivity and online trade

The measurement of people's access to the Internet and the use they make of it remains far from perfect. The problem is particularly acute when it comes to quantitative information about e-commerce in developing countries, where internationally comparable, freely accessible figures are especially scarce.[2] Nevertheless, even if discrepancies in terms of absolute levels exist even among the most reliable sources, a trend towards a rapid increase in the relevant magnitudes is apparent. The Internet continues to grow rapidly

According to the International Telecommunication Union (ITU), the number of Internet users worldwide stood at 500 million people at the end of 2001. This represents 115 million more than at the end of 2000 (or about a 30 per cent increase).[3] The ITU forecasts that at the end of 2002 the global number of Internet users will have grown to 655 million, which would represent a yearly rate of growth of around 31 per cent.[4] In other words, more than 150 million people, roughly the equivalent of a country like the Russian Federation, or 2.5 per cent of the world's population, would be joining the numbers of Internet users every year. Owing to differences in definitions and methodologies, other sources provide slightly different figures; table 1 provides an overview of various estimates of Internet demographics at the end of 2001 and forecasts for 2002. A figure of 500 million current Internet users around the world would therefore seem to be a safe estimate.

Table 1
Estimates of Internet users worldwide (millions)

Source	2001	2002
ITU	500.07	655 (forecast)
Nielsen//NetRatings	498.20	
IDC	497.70	
Nua.com 5[5]	527.57	580.78 (May)

Source: ITU (2001), ITU (2002), Nielsen//NetRatings (2002a), IDC (2002a), Nua.com (2002).

The number of Internet users rises in developing countries

Table 2 uses ITU figures for 2000 and 2001 to show the geographical distribution of the growth in the Internet population:

Table 2
Internet users (thousands), 2000 - 2001 , by region

Region	2001	2000	Increase	% change
Africa	6 738	4 601	2 137	46.4
South Africa	3 068	2 400	668	27.8
Egypt	600	450	150	33.3
Kenya	500	200	300	150.0
Morocco	400	200	200	100.0
Tunisia	400	250	150	60.0
Others	1 770	1 101	669	60.8
Latin America & Caribbean	**26 320**	**19 331**	**6 989**	**36.2**
Brazil	8 000	5 000	3 000	60.0
México	3 636	2 712	923	34.0
Chile	3 102	2 537	565	22.3
Argentina	3 000	2 500	500	20.0
Peru	3 000	2 500	500	20.0
Venezuela	1 300	950	350	36.8
Colombia	1 154	878	276	31.4
Others	3 128	2 253	875	38.8
North America	**156 323**	**136 700**	**19 623**	**14.4**
United States	142 823	124 000	18 823	15.2
Canada	13 500	12 700	800	6.3
Asia	**157 779**	**108 231**	**49 547**	**45.8**
Japan	57 900	37 200	20 700	55.6
China	33 700	22 500	11 200	49.8
Republic of Korea	24 380	19 040	5 340	28.0
Taiwan Province of China	7 820	6 260	1 560	24.9
India	7 000	5 500	1 500	27.3
Others	26 979	17 731	9 247	52.2
Europe	**144 410**	**108 339**	**36 071**	**33.3**
Germany	30 000	24 000	6 000	25.0
United Kingdom	24 000	18 000	6 000	33.3
Italy	16 000	13 200	2 800	21.2
France	15 653	8 500	7 153	84.2
Spain	7 388	5 387	2 000	37.1
Netherlands	5 300	3 900	1 400	35.9
Sweden	4 600	4 048	552	13.6
Russian Federation	4 300	3 100	1 200	38.7
Poland	3 800	2 800	1 000	35.7
Others	33 369	25 403	7 966	31.4
Oceania	**8 505**	**7 635**	**870**	**11.4**
Australia	7 200	6 600	600	9.1
New Zealand	1 092	830	262	31.6
Others	213	205	8	3.9
World	**500 074**	**384 837**	**115 237**	**29.9**

Source: ITU (2002) and UNCTAD calculations. Totals may not add up because of rounding of decimals.

The data show that a growing share of new Internet users are in developing countries. Overall, developing countries accounted for almost one third of new Internet users worldwide in 2001. In the most developed markets penetration is nearing saturation levels as the numbers of those who do not plan to get Internet access in the near future seem to have stabilized.[6] Therefore, the growth in the share of developing countries will continue. Already Asia, excluding Japan and the Republic of Korea, added almost 21 million new users to the Internet in 2001, more than North America. Recent data from sources other than ITU would put the number of Internet users in China at 56.6 million, thus making China the second largest Internet population in the world in absolute numbers.[7] Another study predicts that by 2005 there will be 941.8 million Internet users in the world, or almost twice as many as at the end of 2001, and that the largest number of users will be concentrated in Western Europe and Asia/Pacific (excluding Japan).[8]

In spite of the encouraging increase in the number of users, penetration rates in most developing countries remain very low. On the basis of ITU estimates, the percentage of the world's population using the Internet at the end of 2001 should have been around 8 per cent, that is 30 per cent higher than the 6.4 per cent that the ITU calculated at the end of 2000, but still far below the 50 per cent and above penetration rates in the most advanced countries. Table 3 provides information about these percentages for each region, and how they changed between 2000 and 2001. Details are provided for the countries with the largest absolute numbers of users.

Table 3
Internet users per 10,000 people, 2000-2001, by region

Region	2001	2000	% change
Africa	**85**	**59**	**43.4**
South Africa	701	549	27.5
Egypt	93	71	31.1
Kenya	160	65	145
Morocco	131	70	86.3
Tunisia	412	261	58.1
Others	29	18	56.7
Latin America & Caribbean	**497**	**373**	**33.5**
Brazil	464	294	57.7
México	349	274	27.1
Chile	2 002	1 658	20.8
Argentina	800	675	18.6
Peru	1 149.7	974	18.0
Venezuela	527.8	393	34.3
Colombia	269.6	207	30.0
Others	293	214	36.8
North America	**4 932**	**4 469**	**10.4**
United States	4 995	4 507	10.8
Canada	4 353	4 130	5.4
Asia	**437**	**303**	**44.3**
Japan	4 547	2 931	55.1
China	260	174	49.7
Republic of Korea	5 107	4 025	26.9
Taiwan Province of China	3 490	2 810	24.2
India	68	54	25.5
Others	248	166	49.3

Table 3 (*continued*)

Region	2001	2000	% change
Europe	**1 805**	**1 359**	**32.7**
Germany	3 642	2 918	24.8
United Kingdom	3 995	3 012	32.6
Italy	2 758	2 304	19.7
France	2 638	1 443	82.8
Spain	1 827	1 343	36.1
Netherlands	3 292	2 439	34.9
Sweden	5 163	4 558	13.3
Russian Federation	293	211	38.9
Poland	984	725	35.8
Others	1 151	882	30.6
Oceania	**2 772**	**2 511**	**10.4**
Australia	3 723	3 445	8.1
New Zealand	2 807	2 167	29.6
Others	280	274	1.7
World	**823**	**641**	**28.4**

Source: ITU (2002) and UNCTAD calculations. Totals may not add up because of rounding of decimals.

E-commerce is also growing in developing countries, but more slowly than the number of Internet users

The fact that more and more people are using the Internet, which is a prerequisite for the expansion of e-commerce, is not necessarily an indication of the existence of such expansion or of its pace. Some estimates of the numbers of Internet users count anyone (including, for instance, children) who has had access to the Internet in the previous 30 days. A much higher frequency of access is necessary in order to acquire the familiarity and generate the confidence that are needed in order to become an e-commerce practitioner. Particularly in the case of those engaged in business-to-business (B2B) e-commerce, the order of magnitude of their use of the Internet cannot be of some hours per month, but of hours per day. Indeed, when asked about the use they make of the Internet, people rarely mention e-commerce as a frequent online activity. In a survey of 12 countries, e-mail was the only Internet activity in which more than 50 per cent of respondents in every country surveyed had been engaged in the previous six months.[9] It is safe to assume that in developing countries the proportion of Internet users who are also e-commerce practitioners is lower than average, owing of course to lower per capita incomes but also to other well-known factors such as low credit card usage, lack of relevant products or services or poor logistics and fulfilment services.

It seems that the gap between developed and developing countries in terms of access to and use of the Internet is smaller than the one in terms of e-commerce volumes.[10] Chart 1 illustrates this point.

Table 4 provides a summary of three different sets of forecasts and estimates of worldwide e-commerce released by Internet research firms. The last column shows the implicit compound annual growth rate of e-commerce that results from each of them, calculated using the first and last year for which data from the relevant source are included in the table. To put those figures into perspective, it may be noted that the world's total exports of merchandises and commercial services amounted to $7.43 trillion in 2001.[11] In the most optimistic forecast of the three examples below, the volume of e-commerce sales would be equivalent to about 18 per cent of global sales in 2006.[12]

The differences between forecasts are remarkable. However, while the estimates and forecasts of the absolute levels of e-commerce for a given year can vary by a maximum factor of 2.8 times, the expected rates of growth move in a narrower band, with the highest value 17 percentage points above the lowest. Compounded even over a relatively short span of time, such differences in growth rates yield massive differences in absolute figures, but all three of them represent extremely rapid increases in global e-commerce volumes.

Chart 1

**Shares of world Internet users
and e-commerce revenue**
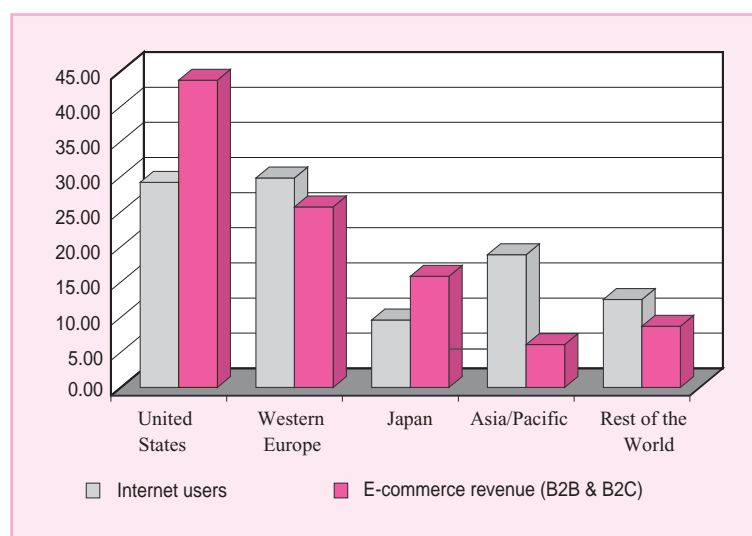
Source: IDC (2002a).

Table 4

**Some estimates and forecasts of worlwide e-commerce
(billions of dollars)**

	2000	2001	2002	2003	2004	2005	2006	CAGR*
Forrester			2 293.50	3 878.80	6 201.10	9 240.60	12 837.30	53.81%
IDC	354.90	615.30				4 600.00		66.93%
eMarketer**	278.19	474.32	823.48	1 408.57	2 367.47			70.80%

Sources: eMarketer (2002a), Forrester (2001), IDC (2002a) and UNCTAD calculations.

* CAGR: compound annual growth rate; ** B2B only.

Forrester (2001) disaggregates its forecast at the national level. Table 5 shows an elaboration of this information in order to indicate the respective weights of developed and developing regions in global e-commerce, as well as the variations in the expected rates of growth. Although the share of developing countries in total world e-commerce is predicted to grow by about 45 per cent, in absolute terms the share will still remain at 6.7 per cent. The overwhelming share of the developing countries' participation in global online trade is forecast to be concentrated in Asia and the Pacific region, with the shares of the remaining developing regions staying below 1 per cent. In this scenario, the annual compound rate of growth of total e-commerce in the developing countries in Asia and the Pacific is expected to be very close to that of the developed countries of Asia. The other developing regions would have very high rates of growth, although from low starting points. Thus, the value of online trade in developing countries, although modest in comparison with the global figures, would amount by 2006 to more than 180 per cent of the lowest estimates of world e-commerce in table 4 for 2002.

Table 5
A forecast of total e-commerce (B2B and B2C)
(Billions of dollars)

Region	2002	%	2006	%	CAGR (%) 2002-2006
Developing Asia and Pacific	87.6	3.8	660.3	5.1	65.7
Latin America	7.6	0.3	100.1	0.8	90.5
Transition economies	9.2	0.4	90.2	0.7	77.0
Africa	0.5	0.0	6.9	0.1	91.1
Total developing countries	**104.9**	**4.6**	**857.5**	**6.7**	**69.1**
North America	1 677.3	73.1	7 469.0	58.2	45.3
Developed Europe	246.3	10.7	2 458.6	19.2	77.7
Developed Asia and Pacific	264.8	11.5	2 052.1	16.0	66.8
Total developed countries	**2 188.4**	**95.4**	**11 979.7**	**93.3**	**53.0**
World total	**2 293.5**		**12 837.3**		**53.8**

Source: UNCTAD elaboration of data from Forrester (2001).

Totals may not add up because of rounded decimals.

B2B predominates over B2C but remains small in developing countries

It is well known that e-commerce takes place essentially between enterprises, so that B2B amounts to around 95 per cent of all e-commerce in most estimates. As usual in e-commerce quantification, sources disagree in their forecasts of absolute B2B volumes, but they coincide in pointing to intense growth in the next few years. Table 6 summarizes several such forecasts. The annual rates of growth they imply range between 81.5 per cent and 54.4 per cent. In the slowest-growth prediction, (Forrester, 2001), growth by region would be fastest in Asia and the Pacific (109 per cent increase between 2000 and 2005), followed by Western Europe (91 per cent) and North America (68 per cent).

Table 6
Some global B2B estimates and forecasts
(Billions of dollars)

	2000	2001	2002	2003	2004	2005	2006
Forrester	-	-	2 160	3 675	5 904	8 823	12 275
IDC	282	516	917	1 573	2 655	4 329	-
eMarketer	278	474	823	1 409	2 367	-	-
Gartner Group	433	919	1 929	3 632	5 950	8 530	

Sources: Forrester (2001); all others as cited in eMarketer (2002a).

Table 7, which presents Forrester's B2B scenario, shows that while the shares of developing countries in both B2B and B2C global e-commerce are expected to remain small in the medium term, the former could remain significantly much weaker, with the proportion between B2B and B2C being 2.5 times smaller in the developing regions than in North America. This would be consistent with the experience of early adopter countries, where B2C was the engine that moved commerce onto the Internet in the very first phases, to be replaced later by B2B, which, using Electronic Data Interchange (EDI), was the only e-commerce modality in pre-Internet times.

Table 7

**Forecast B2B and B2C in 2006, by region[13]
(Billions of dollars)**

	B2B	%	B2C2	%	B2B/B2C
North America	7 127	58.1	211	37.5	34
Asia/Pacific	2 460	20	185	33	13
Western Europe	2 320	18.9	138	24.6	17
Latin America	216	1.8	16	2.9	13
Eastern Europe	84	0.7	6	1.1	13
Africa and Middle East	69	0.6	5	0.9	13
Total	12 275	100	562	100	22

Source: Forrester (2001).

Decimals have been rounded.

For as long as B2B does not take off in developing countries, e-commerce volumes there will remain negligible. The adoption of B2B e-commerce by the enterprises of developing countries will be intimately linked with their capacity to integrate themselves into regional and global supply chains. At the enterprise level, this requires being able to meet technological and organizational challenges. At the country level, the digital and the physical sides of their economies will have to be much better connected, because – except in the services sector – B2B e-commerce has almost as much to do with traditional, physical infrastructure (ports, railways, roads), logistics services and trade facilitation measures that are essential for supply chains to work as it does with ICT infrastructure. Foreign direct investment flows and the linkages between local producers and transnational corporations will be other important determinants of the growth of B2B e-commerce in developing countries.

Facilitating the take-off of B2B in developing countries is important because of the opportunity for growth that it represents. After all, if e-commerce matters for development it is not because it is a fancier or more convenient way to go shopping: e-commerce matters because it allows enterprises to generate efficiency gains at all the stages of their production and distribution processes. It is these gains, made essentially through the adoption of B2B and e-business practices, that count for development, because they translate into improved competitiveness for enterprises and higher levels of productivity, and hence incomes for the economy as a whole.

B2B electronic marketplaces or exchanges in their various forms (private, independent or consortia-backed) used to be seen as one of the major factors of change in this area. Their evolution in the last few months seems to confirm the view expressed in UNCTAD (2001) – that although their potential benefits can be considerable, many enterprises, especially in developing countries, may find them elusive for some time. This point is illustrated by chart 2, which presents information from a worldwide survey of e-markets that was conducted in 2001, and confirms the limited presence of developing regions in the e-market sector.[14]

Adapting business processes and technology to this new environment takes time and money. For instance, the necessary steps such as standardizing procedures and data definitions among the various players involved can be a time-consuming exercise in fragmented industries. However, as e-market operators refine their business models, for instance by addressing issues of confidentiality and price transparency, and also as leading enterprises attract their smaller partners into e-markets, it is to be expected that these systems will continue to absorb a growing share of global B2B sales. If the logic of simply buying and selling in a pure exchange environment evolves towards a more comprehensive concept of full collaboration among enterprises along the entire supply chain, the gains that many enterprises in developed countries (by some estimates, up to 80 per cent of those that have moved their purchase function online) seem to be achieving from online procurement of indirect goods can be spread more generally and reach higher levels.

Chart 2
Primary regions served by surveyed public exchanges, 2001
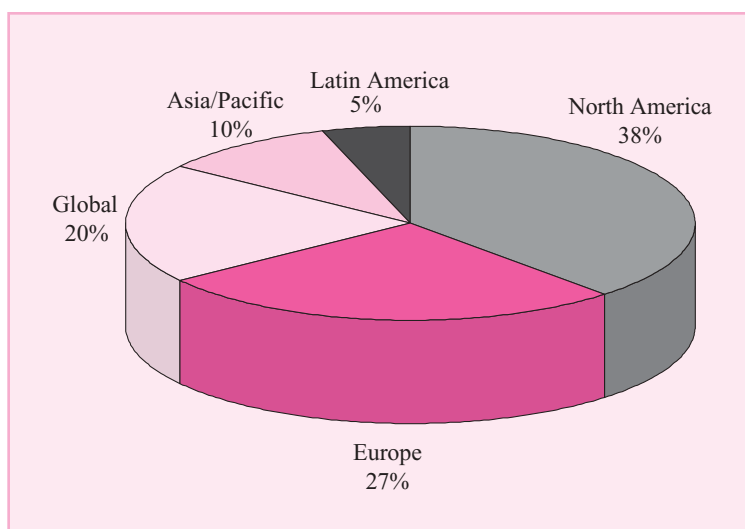
Source: Booz Allen Hamilton and Giga Information Group as cited in eMarketer (2001c).

Even though online procurement and, on a larger scale, supply chain management can cut costs dramatically if accompanied by the necessary organizational changes, they are far from being the only ways in which B2B e-commerce can enhance the competitiveness of an enterprise. Thus, a B2B trend that is gaining momentum in the more advanced markets is the deployment of demand-chain IT solutions. In 2001, when the economic environment encouraged enterprises to examine their IT outlays more closely, sell-side e-commerce solutions seemed to be among their top spending priorities in the area.[15] The purpose of these efforts is to enhance the efficiency of the interaction between a company with existing customers and/or the various players along its distribution channel and to enable it to reach a larger number of potential customers. Web-enabled demand-side applications help companies achieve these objectives through a wide range of possibilities, such as new, more valuable services for customers based on online availability of information, economically viable product customization, better understanding and predictability of customer needs and behaviour, or making it possible to work online with smaller customers at a reasonable cost.

B.   Regional perspectives

Connectivity is slowly improving in Africa, but e-commerce remains limited

With local Internet connection now available in all African capital cities the possibilities (in terms of connectivity) to engage in e-commerce have markedly improved, at least for the minority of Africans who live in the continent's major urban centres. In 18 countries calls to access the Internet are now charged at local rates. Legal monopolies in Internet service provision have almost disappeared, although de facto Internet service provider (ISP) monopolists still operate in several of the smaller markets. The number of dial-up subscribers grew by 30 per cent in 2001 and now stands at about 1.3 million. Incoming Internet traffic represents 1 gigabyte per second, while the outgoing is around 800 megabytes per second.[16] According to Intelsat, its data traffic from Africa grew by 30 per cent in 2001 and is expected to overtake voice traffic by 2005.[17]

In spite of all these positive developments, the gap in the availability of the basic infrastructure for e-commerce between developed and developing countries is largest in Africa. Table 2 showed that while in the most advanced countries half of the population uses the Internet,[18] only 1 in 118 people can do the same in Africa and only 1 in 440 when the five countries with the most users are excluded from the calculation. Although mobile telephony has expanded extremely rapidly across the continent, it does not yet offer an alternative, for the purpose of connecting to the Internet, to the scarce fixed lines. Cost considerations also remain a very considerable obstacle to access to the Internet. The average cost of using a local dial-up account in Africa for 20 hours a month is about $68 per month, including local call time but not line rental charges.[19] Since the World Bank estimates that the gross income per capita for sub-Saharan Africa in 2000 was $470, it is clear that for the vast majority of Africa's population it is utterly impossible to pay such access costs.

For the few who can use the Internet, the experience in terms of speed and stability is often very different, and much more inadequate for e-commerce purposes, than that of users in other regions. Given the cost and low speed of connections e-mail is even more important for African users than in the rest of the world; many turn to web-based free providers based in developed countries for this service, even if this means longer connection times. The reason for this seems to be concerns about privacy and the long-term survival prospects of local providers.

Very few updated statistics or even estimates of e-commerce volumes in Africa are available, except for South Africa. Some forecasts put total e-commerce in Africa at $0.5 billion in 2002, concentrated almost exclusively in South Africa, and predict that it will grow to $6.9 billion by 2006, with South Africa generating $6.1 billion and Egypt almost all the rest. In this scenario, Africa's share in global e-commerce by 2006 would represent 0.05 per cent of global online trade.[20] Given the comparatively low level of integration of African enterprises into international trade and the continent's pattern of exports, it is not surprising that B2B outside South Africa remains almost negligible. However, B2B opportunities have been identified in the online and offline services sector.[21]

In spite of the extremely low volumes involved, anecdotal evidence of African e-commerce success stories in the B2C sector is amply available.[22] As is to be expected in view of the low levels of income and con-

nectivity on the continent, exports represent the vast majority of online trade in Africa. Among these, handicrafts and products and services targeting Africans outside their home countries seem to dominate.[23] As for the most mature e-commerce market on the continent – South Africa – retail online sales remain at low levels. According to data released in May 2002, B2C sales in South Africa in 2001 amounted to only $16 million, which represented 0.1 per cent of total retail sales in that country.[24]

Latin America makes progress but faces sharp divides[25]

E-commerce in the Latin American region is highly concentrated in four relatively developed Internet markets (Argentina, Brazil, Chile and Mexico), which together account for more than two thirds of the number of Internet users in the region[26] and, according to some estimates, 85 per cent of all paid dial-up Internet accounts.[27] While Internet access providers in these markets are starting to introduce satellite services and broadband access, the problems faced by the majority of the other countries in the region remain very basic and relate to problems such as low fixed-line penetration.

In the four countries mentioned above (and in other smaller markets, especially in the Caribbean area), enterprises, or at least those in the formal sector, are reasonably e-commerce aware, and the situation is improving rapidly in other countries in the region (Colombia and Peru). Overall, between 50 and 70 per cent of Latin American enterprises are estimated to have access to the Internet, and by the end of 2001 virtually all companies with 200 or more employees were expected to have a website.[28] However, for most enterprises being aware of e-commerce does not immediately lead to their actually engaging in it. E-mail is widely used for business contacts and market information is gathered through web services, but only a minority of enterprises carries out online transactions. The use of e-business applications for customer relationship management, supply chain management or enterprise resource management is not widespread.

In January 2001 it was estimated that B2B transactions in Latin America had reached $2.85 billion in 2000.[29] Given the relatively large volume of intra-industry trade in the region, B2B e-commerce is expected to continue to expand rapidly. The same study forecast $67 billion in B2B e-commerce revenue in the region in 2004; as indicated in table 5 above, Forrester (2001) predicts that by 2006 the figure will have grown to

$215.7 billion (1.8 per cent of global B2B e-commerce), up from $18.1 billion in 2002.

Large transnational corporations, notably in the automotive sector, are playing a key role in the development of online B2B transactions, especially in Brazil and Mexico. In Brazil, the largest e-commerce market in the region by far,[30] the adoption of both B2B and B2C practices has been spearheaded not by dotcom start-ups but by traditional players seeking to diversify their distribution channels and to improve the efficiency of their supply chain operation. For instance, in 2000 Volkswagen's Brazilian subsidiary reported $5 billion in purchases made through its online procurement system, which links it with over 500 suppliers directly involved in production activities and some 3,000 in all.[31] Locally owned Brazilian players, especially banks and retail chains, are also keen adopters and promoters of B2B e-commerce. Finance and government-related e-commerce applications such as tax collection, information gathering and procurement[32] are among the other major e-commerce sectors in Brazil.

With regard to B2C, the region has experienced robust growth in recent years. eMarketer (2001a) estimated B2C e-commerce in Latin America at $724 million in 2000. According to Boston Consulting Group, retail sales in Latin America reached $1.28 billion in 2001, more than doubling the $540 million estimated for 2000.[33] Of the total retail e-commerce in the region, 54 per cent ($906 million) would be accounted for by Brazil; Mexico's online retail sales would amount to $134 million, Argentina's to $119 million and Chile's to $45 million. Strong growth was expected for almost all these markets in 2001 and 2002, the exception being Argentina, where retail e-commerce is expected to have very little, if any growth at all, in 2002.[34]

Some aspects of B2C e-commerce in Latin America differ from the patterns observed in more consolidated markets. For instance, online car sales, which have not taken off elsewhere, represent the largest e-retail item in Latin America at an estimated $504 million in 2001 with the Brazilian subsidiary of the French car-maker Renault expecting to sell 15,000 cars (20 per cent of its total sales) online in 2002. Consumer auctions ($203 million), travel ($140 million) and computer hardware and software ($139) are the other individual items each amounting to over $100 million per year.[35] As a curiosity, online groceries sales, at $79 million, are the only sector in which the share of online sales in total sales in Latin America (especially in Argentina and Brazil) is similar to that of the United States. Another sector in which B2C providers in the region, particularly in Brazil, have developed a competitive edge is banking. For instance, Brazil's largest private bank, Bradesco, was among the first five banks in the world to offer Internet services. Another Brazilian bank, Unibanco, was the first to introduce the first virtual credit card in the world in cooperation with Mastercard.[36]

There are no surprises as to the major obstacles to the expansion of retail e-commerce in the region, which are the same as in other developing regions: low Internet penetration rates, inadequate payment systems, poor fulfilment systems and low-quality customer service. On the other hand, significant progress has been made in the region in terms of awareness creation as evidenced by the large proportion of formal-sector enterprises with Internet access and the development of a legal framework for e-commerce as illustrated by the fact that all major economies in the region have undertaken legal changes to accommodate e-commerce.

As in other developing regions of the world, an issue whose implications for the future of e-commerce are not yet clear is the effect of widespread access to mobile telephony. In several Latin American markets mobile telephony users already outnumber fixed-line subscribers. Some analysts believe that Internet access through handheld devices could reach the same levels as PC-based access by 2005 and thus make up for the region's low fixed-line penetration.[37] Whether this would be feasible and would have an impact on e-commerce volumes without changes in the technological basis and the business models remains unclear.

Asia and the Pacific lead in the adoption of e-commerce among developing countries

Demographic weight alone could be enough to explain the leading position of the Asia/Pacific region in the spread of e-commerce in developing countries: at current rates, the region is adding close to 50 million new Internet users a year. This is more in absolute terms, and relatively faster than any other region of the world. But other factors come into play besides sheer demographics. Enterprises, particularly in the manufacturing sector, are more integrated into intra regional and global trade flows than those of other developing regions. This means that they are more exposed to pressures from their customers in developed countries to adopt e-business methods and are investing to be able to do so. New broadband technologies are being deployed faster in some middle- and high-income

countries in the region than anywhere else. For example, the world's top three markets as regards the number of digital subscriber lines (DSL) per 100 people are the Republic of Korea (10.95), Hong Kong, China (5.56) and Taiwan Province of China (4.83). In all, 46 per cent of all DSL in the world at the end of 2001 were in the Asia-Pacific region.[38] Finally, governments across the region, both at the national level and in the context of regional forums such as the Association of South-East Asian Nations (ASEAN) and the Asia-Pacific Economic Cooperation (APEC), have taken a proactive role in the promotion of e-commerce, adapting the legal and regulatory framework, embracing e-government and implementing e-awareness and education plans.[39]

Given its massive size and potential, the evolution of e-commerce in **China** will be determinant for the region's and, in the medium term, for global e-commerce volumes.[40] A report by the China Internet Network Information Center (CNNIC) released in January 2002 confirms the recent rapid growth of the Chinese Internet population (almost at the rate of 50 per cent in 2001), the concentration of users in the major urban centres and in the coastal provinces (while the Internet penetration rate is 10.4 per cent in the Guangdong region, it is as low as 0.2 per cent in Quinghai province), and an improvement in the number of women and people with lower education levels who access the Internet.[41] China's Internet population, already the world's third largest,[42] is well placed to become the largest online population in the region in the near future, even if infrastructure problems and per capita income levels will keep penetration rates low. The transformation of this large potential into an actual e-commerce market may not happen at the same pace. According to CNNIC (2002), more than two thirds of Chinese Internet users have yet to make their first online purchase. Of those who have done so, only about one third said they were "quite satisfied" or "satisfied" with the experience.

Logistical difficulties such as insufficient transport networks represent a serious obstacle to B2B development, as they make it difficult for companies to realize the potential gains of increased efficiency in their supply chains. Another commonly cited obstacle to B2B in mainland China is the emphasis that the traditional business culture places on strong personal relationships. However, this does not seem to have prevented other Chinese-culture markets from adopting e-business practices. Whatever the case may be, forecasts of B2B volumes diverge significantly. While some sources put it at as much as $6 billion for 2002 and

point to strong growth bringing the figure to nearly $22 billion by 2004,[43] other estimates paint a much less optimistic picture – for them, from a low base of $600 million, B2B e-commerce in China would amount to only $9.6 billion in 2006.[44]

Japan, which for the time being still ranks as the country with the largest Internet population in Asia, experienced strong growth in e-commerce sales in 2001 despite the poor overall performance of the economy. According to data from the Electronic Commerce Promotion Council of Japan, online sales grew by 58.4 per cent in 2001 and reached a total value of $264.5 billion, of which 96 per cent was in the B2B sector.[45] Other estimates put the total e-commerce volume in Japan at a more modest level, predicting that it will amount to only $186 billion in 2002.[46] Recent growth in e-commerce in Japan seems to have been strongest in sectors such as chemical and industrial machinery and paper and office goods, although information technology goods and the automotive industry remain predominant. In the B2C sector growth was strongest in clothing, leisure and travel services, and real estate. Overall, however, e-commerce volumes remain comparatively low considering the high levels of disposable income, the exception being Japan's lead in the adoption by consumers of some mobile Internet services. Broadband access is also growing at a rate of about 300,000 new subscribers per month (1.5 million subscribers were reported as of January 2002), which should bring the total number to 5 million at the end of 2002. The rapid growth of DSL service may have been stimulated by the Government's "e-Japan strategy", which aims at providing high-speed access for at least 30 million households and ultra high-speed for another 4 million in the next five years.

Although absolute volumes remain modest, e-commerce growth in 2001 and in the first quarter of 2002 in the **Republic of Korea** was dramatic. The most recent data available for 2002 from the National Statistical Office show year-on-year increases in e-commerce sales of 83.4 per cent (April), 89.2 (March), 84.9 (February) and 89.8 (January). This would represent total online sales of $1.04 billion in the first quarter of 2002.[47] These figures do not capture most of B2B trade in the country. In contrast, other forecasts go as high as $29 billion for total e-commerce in 2002, rising to about ten times that amount by 2006.[48] Contributing to this will be the fact that the Republic of Korea has the world's highest penetration of broadband technologies (as of May 2002 there were over 8.5 million DSL subscribers or 18 per cent of the population).[49] A number of factors seem to be playing an important

role in the rapid deployment of this technology,[50] including proactive government policies supporting the laying of a dense optic fibre network in the major urban centres, the high density of the Republic of Korea's residential patterns which facilitated the establishment of "last mile connections", and intense competition between operators, resulting in affordable subscription costs.

India, whose Internet population is expected to be second only to China's by 2006, remains a small e-commerce market, which is estimated at half the volume of China's, or about a total of $300 million for 2002.[51] As in most other countries, e-mail is the favourite application of India's seven million Internet users,[52] who are worried about the security of online payments and do very little online shopping. As in other developing countries, PC and telephone penetration rates are very low and competition among ISPs is limited. B2B volumes are concentrated in the automotive sector and in banking and financial services. However, India has developed a successful industry in IT and in the IT-enabled services sector, whose potential annual e-commerce sales have been estimated at $10 billion.[53] Chapter 5 examines the prospects and challenges of this industry in developing countries and its potential contribution to the development of e-commerce.

A summary of the situation and potential evolution of e-commerce in a number of **other Asian developing countries**, based on Forrester (2001), is provided in table 8. According to this estimate, these countries would generate 2.5 per cent of global online trade in 2002 and 3.2 per cent in 2006.

Table 8
Total e-commerce (B2B and B2C) in selected Asian countries and territories (2002-2006, billions of dollars)

Country/Territory	2002	2006	CAGR (%)
Hong Kong, China	15.6	98.8	58.6
Indonesia	0.1	1.6	100
Malaysia	1.7	18.4	81.4
Philippines	0.1	1.4	93.4
Singapore	10.5	66.4	58.6
Taiwan Province of China	29	223.8	66.7
Thailand	0.2	2.9	95.1
Combined total	57.2	413.3	63.9

Sources: Forrester (2001) and UNCTAD calculations.

Decimals have been rounded. CAGR: compound annual growth rate.

Rapid growth but very modest volumes in countries with economies in transition

Rapid growth in both B2B and B2C is expected in the Central and Eastern European countries with economies in transition. However, even with annual rates of growth of 90 per cent, given the very low baseline from which they are starting it is unlikely that e-commerce in transition economies will reach 1 per cent of global e-commerce before 2005. Table 9 shows two estimates of the evolution of e-commerce in transition economies.

Table 9
Estimates of the evolution of e-commerce in transition economies (Billions of dollars)

Source	2001	2002	2003	2004	2005	2006	CAGR
IDC*	1.25	-	-	-	-	23	79%
Forrester**	-	9.2	17.9	33.7	56.6	90.2	76.9%

Sources: IDC, as cited in eMarketer (2002e); Forrester (2001).

* IDC data refer to the Czech Republic, Hungary and Poland (B2B only).

** Forrester data refer to the Czech Republic, Hungary, Poland, the Russian Federation, Slovakia and Ukraine.

The landscape of Internet penetration and of e-commerce adoption in the region offers strong contrasts. While the more advanced reformers, such as the Czech Republic, Estonia, Slovenia and to some extent Hungary or Poland have relatively high rates of digital literacy and are putting in place the foundations for the development of e-commerce activity, others (particularly in the Balkans, the Caucasus and Central Asia) remain far behind. In the short term the differences between these two groups of transition economies are likely to deepen as the more advanced countries accede to the European Union. Their accession should result in improved competition in the telecommunications sector and an enhanced regulatory framework for e-commerce. Even in the best-positioned countries there are differences in access between urban and rural areas.

Together with low per capita incomes, relatively expensive telecommunications, lack of trust due to delays in the development of an adequate legal framework and underdeveloped payments and credit systems are commonly cited obstacles to the development of e-commerce in these countries.

Nevertheless, countries in the region can count on a number of favourable factors that may contribute to

the enhancement of their capacity to benefit from information and communications technologies (ICT) applications and particularly e-commerce. For instance, in the Russian Federation, a number of B2B trading platforms have been developed as a response to the preponderance of exportable commodities in its economy and the importance of Internet-generated efficiency gains in small-margin markets such as commodities.

The high levels of general education prevalent in many countries in the region, and in particular the relative abundance of workers with advanced IT skills, could be another source of competitive advantage for the region. The proliferation of Linux server software in some of the Baltic countries is an example of how companies are benefiting from opportunities to access low-cost, high-performance technologies that can be absorbed only in the presence of an adequate level of IT skills in the workforce.

Growth continues in North American and Western European markets

In both Western Europe and North America, e-commerce growth seems to have suffered little as a result of the prevailing poor economic conditions.

In the United States, according to the Department of Commerce, B2C e-commerce grew by 19.3 per cent in the first quarter of 2002 compared with the same quarter of 2001. In the same period total retail sales (online and offline) increased by 2.7 per cent. As a result, online sales represented 1.3 per cent of total retail sales, almost twice the 0.7 per cent they represented when the Department of Commerce first produced e-commerce estimates in 1999.[54]

Given that the figures compiled by the Department of Commerce exclude some important items in B2C commerce, such as airline tickets, it may be useful to complement its data with other sources. For instance, in a sample of 11 estimates by private research firms the median estimate of the total value of B2C e-commerce in the United States in 2001 was $53.1 billion.[55] Estimates for 2002 are around $70 billion, which would mean an increase of over 30 per cent compared with 2001.[56]

In Europe, B2C volumes remain considerably smaller, and are estimated at around $ 20 billion in 2001.[57] Various forecasts predict that by 2005 the value of European B2C will be between 5 and 10 times that amount.[58] A positive influence in the development of European B2C was the arrival of the "physical" euro

at the beginning of 2002, which may be making it easier for consumers to benefit from enhanced price transparency in cross-border B2C sales in the euro area. On the other hand, the European market in several B2C sectors remains fragmented because of cultural and/or linguistic barriers and differing consumer preferences.

It has been argued that the growth in B2C during an economic slowdown can be attributed to consumers looking for bargains. It seems more likely that the figures show that rather than being a maturing activity, online retailing is still in a phase of intense growth even in those economies where it took off earlier. Even though the growth in the number of Internet users is slowing down, users are becoming more inclined to engage in e-commerce. In the United States, at the end of 2001, 58 per cent of Internet users had made purchases online, compared with 51 per cent a year before. The amounts spent by online consumers are also growing: the average online expenditure per person in the end-of-year season is estimated to have grown by 18.8 per cent between 2000 and 2001, from an average of $330 to $392.[59] Other B2C estimates, covering online orders for the first quarter of 2002, are lower ($127 per average online order) but also show growth (5.3 per cent) compared with the equivalent figure from 2001.[60] Growth in Western Europe is slower and only 17 per cent of consumers are buying online, although another 18 per cent use the Internet to gather information before making a purchase.[61]

Another positive sign for B2C e-commerce in the United States, particularly after the loss of credibility experienced by many dotcom projects, was the fact that 56 per cent of online retailers managed to make a profit in 2001, while only 43 per cent had done so in 2000. Reducing expenses, particularly in marketing, was crucial to the improvement of profitability. Customer acquisition costs were reported to have fallen from $29 in 2000 to $14 in 2001.[62] The good results of "clicks-and-bricks" retailers seem to confirm the better competitive position of business models that combine the efficiency gains of online operations with the logistical and direct contact advantages of an offline presence.

Although even in the United States the weight of B2C in total retail sales remains modest (below 3 per cent in the most optimistic assessments), it has progressed significantly more in a number of sectors, in some of which online sales already amount up to 18 per cent of total sales. Some of these sectors, such as software,

travel and tourism services, and music, could represent good opportunities for developing country suppliers.

It is in the area of B2B that, in spite of the great difference in the amounts traded online in Europe and in the United States, with B2B volumes being about seven times larger in the United States than in all the developed countries of Europe combined, the implementation of e-business strategies in European companies will more closely follow, both in time and in modalities, the patterns established by their North American counterparts.

Forrester (2001) forecasts that 26 per cent of sales in the United States, mostly B2B, will be traded online by 2006, and European online sales are predicted to amount to 19.3 per cent of total sales. Other studies predict that European B2B will represent 21 per cent of all European commerce between companies as early as 2004.[63] Such growth would involve a massive transfer of transactions to an online environment, considering that online B2B in 2001 was, at most, 2 per cent of all B2B transactions in the United States and much less in Europe. The gap between online B2B purchasing penetration rates in the United States and those in Europe are predicted to decrease by 30 per cent, although this will still mean that online B2B purchasing will be only 5 per cent of all European B2B, while in the United States it will amount to 33 per cent.[64]

In terms of industries, financial services, electric and electronic equipment industries, other business activities[65] and transport, retail, metal and machinery, chemicals and petroleum, postal and telecom, vehicles and pulp and paper industries are among those in which the percentage of online B2B purchasing is expected to become higher by 2004.[66]

Both in the United States and in Western Europe the potential savings generated through e-business tools for procurement, supply chain operations, business process outsourcing and, to a certain extent, e-marketplaces will attract attention and investment in B2B. In e-procurement, the focus will probably move from indirect goods, where the limits to potential benefits may be reached earlier, to the acquisition of inputs directly used in the productive process. Successful e-procurement implementation is reported to result in savings in lead times of up to 30 per cent and reductions in transaction processing costs of up to 25 per cent.[67] As mentioned before, the demand-chain aspects of B2B operations, such as customer relationship management tools, are becoming more important

items in the IT budgets of large companies in developed countries.

In 2001, European companies spent a much larger share of their IT budgets on e-business solutions than did their United States counterparts, thus starting to close the transatlantic gap in the implementation of e-business.[68] Not only was European e-business expenditure larger, but also (according to the companies themselves) it was the result of different motivations. While for North American managers the main objectives of their e-business projects in 2001 were to ensure customer loyalty, to improve productivity and to reduce costs, for European companies it seems that acquiring new customers was by far the first priority in their e-business projects.[69]

C.   E-commerce and development: the international dialogue

The previous sections attempted to show that the process of Internet-generated global economic changes did not slow down with the global economy in 2001. Although technology is the engine that drives this process, it is people's decisions and attitudes that set its direction. Whether the outcome will be an increase or a reduction in the capacity of developing countries to close the gaps that separate them from the industrialized world will therefore depend to a not inconsiderable extent on factors that policy makers, business players and other stakeholders can influence. These include, for instance, the e-business environment or the promotion of a proactive attitude towards organizational change. In practical terms, policies must be designed, articulated in coherent e-strategies and implemented in partnership with all the relevant e-players to ensure that the new possibilities to create, transform, apply and exchange information and value are used to improve the productivity of developing economies and their enterprises.

 A participatory approach, at both the national and international levels, to the development and implementation of e-commerce strategies seems essential for their success. If such multi-stakeholder approaches are the key to the long-term success of development strategies in general, their importance is even greater in an area such as e-commerce. Creating awareness at the political level or adopting a state-of-the-art regulatory framework will be sterile unless the prospective e-commerce practitioners perceive these strategic elements and the objectives they serve as relevant and

appropriate to their needs, interests and capacities. The concept of the Internet as a separate, self-regulated community free from government intervention has not survived its confrontation with the realities of commercialization. Yet there is some truth left in the vision of the Internet as a frontier where government action, while necessary and desired, will be more likely to succeed if it relies on the support of the pioneers who first cleared the land, such as the volunteers that developed open-source code or the non-governmental organizations that brought telephones to areas that telecommunications monopolists had left unattended. This can only be achieved if e-commerce strategies are developed through a consultative process that allows the involvement of all the relevant players in the private sector and the civil society.

The process of designing the strategies that can make e-commerce a force working for development must necessarily include an international component. Each national Government has the responsibility of defining, in a dialogue with the other domestic stakeholders, the areas where they feel change must be undertaken, and the pace at which they wish to implement it in order to respond to the challenges of competition in the digital economy. The international community can support these efforts by ensuring that the developmental perspective is present in a meaningful way in the multiple international discussions about the Internet, ICTs and the organization of their economic applications. It should also assist interested developing countries in the formulation and implementation of their national e-commerce strategies for development by mobilizing resources and contributing to the sharing of experiences.

The role of e-strategies in broader national development strategies has attracted growing interest in several international forums where the issue of the global digital divide is being addressed, such as the G-8's DOT Force and the ICT Task Force launched by the Secretary-General of the United Nations in November 2001.[70] Thus, the Plan of Action adopted by the G-8 in Genoa in 2001 included as its first action point "to help establish and support developing country and emerging economy national e-strategies".[71] Ensuring that the benefits of ICT are available to all is also one of the key goals that the international community set itself in the Millennium Declaration.[72] As part of the action undertaken by the United Nations towards the achievement of these goals, its ICT Task Force has identified the provision of assistance to developing countries in designing national and regional ICT strategies as one of its medium-term goals and has set up a working group to that end.

A close relationship between national e-commerce strategies and international cooperation would be greatly facilitated by the emergence of a common understanding of the fundamental elements of e-commerce strategies for development, especially if, as seems desirable, ICT is to be mainstreamed into official development aid programmes. That is a major objective of the intergovernmental policy dialogue that is currently taking place in UNCTAD in the field of e-commerce both in Geneva and through a series of high-level regional workshops in the field. Contributing to greater awareness and better understanding of the issues at stake for developing countries is also the objective of the E-Commerce and Development Report 2002.

Notes

1 UNCTAD (2002).

2 See, for example, a discussion of the issue of Internet access and activity measurement in Minges (2000). The problems of the measurement of e-commerce in developing countries were discussed in UNCTAD (2001).

3 International Telecommunication Union (2002).

4 International Telecommunication Union (2001).

5 In May 2002 the breakdown by region was as follows: Africa, 6.31 million; Asia/Pacific, 167.86 million; Europe, 185.83 million; Middle East, 5.12 million; Canada and United States, 182.67 million; Latin America, 32.99 million. See Nua.com (2002).

6 At least as far as PC-based access to the Internet is concerned. Other forms of Internet access still show large growth potential in developed countries.

7 Nielsen//NetRatings (2002b).

 8 IDC (2002a).

 9 Nielsen//NetRatings (2002c).

10 IDC (2002a).

11 WTO (2002).

12 Forrester (2001).

13 The classification of countries in regions used by the source does not coincide with the one normally used by the United Nations. Forrester (2001) adds data for Mexico in its North American aggregates. For the purpose of this chapter, Mexican figures are included in Latin America.

14 Booz Allen Hamilton and Giga Information Group (2001).

15 eMarketer (2001c).

16 The information about Internet connectivity, costs and usage patterns in Africa is taken from Jensen (2002).

17 ITWeb.co.za (2001).

18 Other estimates put this figure at over 60 per cent.

19 Jensen (2002).

20 Forrester (2001).

21 Descriptions of the situation and prospects for e-commerce in Africa can be found in UN Economic Commission for Africa (2001) and UNCTAD (2000).

22 See, for example, the African cases in the survey of e-commerce in the LDCs contained in chapter 9 of UNCTAD (2001).

23 Part of e-commerce B2C targeting expatriate Africans may not be increasing the export capacity of local producers, as some of the goods and/or services sold to them may be replacing direct monetary transfers to their relatives and are consumed locally by them.

24 World Wide Worx (2002).

25 See Hilbert (2001) for an overview of the main e-commerce issues in Latin America.

26 ITU (2002a).

27 Yankee Group (2001).

28 Hilbert (2001).

29 eMarketer (2001a).

30 Estimates of the relative weight of Brazil in Latin American e-commerce vary. It is safe to assume that it represents at least 50 per cent of e-commerce in the region.

31 Bastos (2001).

32 In January 2002 the federal government of Brazil announced savings of $208 million thanks to its use of e-government services. Its portal, Rede Governo, gives access to some 1,500 services.

33 Boston Consulting Group (2001a).

34 According to a report by the Argentinean consulting firm Price & Cooke, quoted in wired.com in March 2002, the growth in Internet users in Argentina would fall to one-digit figures in 2002. See wired.com (2002).

35 Boston Consulting Group (2001a).

36 United States Commercial Service (2001).

37 wired.com (2001).

38 eMarketer (2002c).

39 See, for example, the e-ASEAN Task Force website at http://www.e-aseantf.org/ for information about national and regional initiatives in the areas of e-commerce, legislation, awareness creation and human resources development.

40 For a more detailed discussion of e-commerce in China see UNCTAD (2001).

41 CNNIC (2002).

42 Or the second largest, by some estimates.

43 eMarketer. (2001b).

44 Forrester (2001).

45 Electronic Commerce Promotion Council of Japan (2002).

46 Forrester (2001).

47 National Statistical Office of the Republic of Korea (2002).

48 Forrester (2001).

49 *Korea Times* (2002).

50 eMarketer (2002c).

51 Forrester (2001).

52 India's National Association of Software and Service Companies (NASSCOM) calculates that the number of active subscribers as of March 2002 was only 1.5 million.

53 According to a 2002 joint study of NASSCOM and McKinsey; see NASSCOM (2002).

54 United States Department of Commerce (2002). Figures are not seasonally adjusted.

55 The estimates had been made at different times between late 2000 and March 2002 by Jupiter Media Metrix, Datamonitor, Cyber Dialogue, eMarketer, Forrester, ComScore, Yankee Group, GartnerG2, Giga Information Group, Boston consulting Group and IDC. See eMarketer (2002d)

56 eMarketer (2002d) and Forrester 2001.

57 See IDC (2002 b) or European Information Technology Observatory (2002).

58 See a table setting out forecasts by several research companies at www.emarketer.com/ereports/europe_ecom/welcome.html.

59 Information Technology Association of America (2002).

60 *E-commerce News* (2002).

61 Cap Gemini Ernst &Young (2002).

62 Boston Consulting Group (2002).

63 Boston Consulting Group (2001b).

64 Boston Consulting Group (2001b).

65 These include business services, real estate leasing and sales, machinery leasing, private health services and recreational services.

66 Boston Consulting Group (2001b).

67 Boston Consulting Group (2001b).

68 According to a study by the consulting firm Accenture, the gap between Europe and the United States in the adoption of e-commerce technology amounted to 12 months as of mid-2001. See eMarketer (2002b).

69 Computer Sciences Corporation (2001).

70 See www.unicttaskforce.org.

71 See www.dotforce.org/reports.

72 See General Assembly resolution A/RES/55/2 of 18 September 2000, available at www.un.org/millennium/declaration/are552e.pdf.

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Chapter 2

THE DOMAIN NAME SYSTEM AND ISSUES
FOR DEVELOPING COUNTRIES

A.   Introduction

The E-Commerce and Development Report 2001 provided a survey of key legal and regulatory issues arising with the development of e-commerce. As part of that broad review in chapter 6, the Report briefly addressed the issue of domain names,[1] providing in particular a jurisdictional analysis of the Anticybersquatting Consumer Protection Act enacted in the United States in November 1999,[2] and considering also whether the domain name dispute resolution procedure adopted by the Internet Corporation for Assigned Names and Numbers (ICANN)[3] – entitled the Uniform Domain Name Dispute Resolution Policy (UDRP)[4] – provides a useful model more generally for alternative dispute resolution (ADR) or online (ODR) procedures.

This chapter seeks to provide more in-depth information concerning the development and functioning of the Domain Name System (DNS) and the use of domain names, while giving attention in particular to background, policies, initiatives and issues of relevance for developing countries. Even though the aim of this chapter is to provide a more thorough treatment, it cannot hope to cover all of the relevant information and issues of interest concerning domain names. Readers who wish to obtain additional information are referred to a number of useful resource sites on the Internet.[5]

The focus on domain names and the relevant concerns that have surrounded their emergence leads to a study of the various commercial, technical, regulatory and legal issues that have arisen more generally with the emergence of e-commerce and the increasing use of open communications networks such as the Internet. Unlike the telecommunications sector, which has historically been subject to international[6] and State regulation of the large (often State-operated) tele-

phone system operators, the DNS has followed a very different path to development.

The rapid growth in use of the Internet has led to increasing importance being placed on the DNS as a secure and reliable general-purpose communications infrastructure. Yet the DNS, particularly in its earliest stages, has not been subject to centralized regulation through international treaty or otherwise, nor has its development been marked by the initiatives of large enterprises such as telecommunications operators.[7] Instead, a key characteristic of the DNS, like the rest of the Internet, is that it functions through distributed computer networks largely under independent control, yet adhering to common technical protocols. Its rapid development has taken place at a time when self-regulation, rather than legislated international norms, is widely favoured in the "Internet space". Moreover, a new generation of technology companies and Internet engineers, which have acted as a significant moving force behind the Internet's development, have brought new perspectives and ideas to the policy discussions and debates on various issues. All of these elements together present a new and often confusing array of commercial, technical, legal and regulatory issues.

Developing countries attempting to build up their own national infrastructure to support increasing Internet use need to be aware of the multifaceted issues that may confront them. As many developing countries have already come to realize, the development of a national DNS infrastructure, including operative business model, technology and relevant domain name registration policies, could provide an incentive to citizens, local businesses and others to consider registering in the national top-level domain (e.g., such as ".br" for Brazil or ".th" for Thailand). This in turn would serve the goal of ultimately expanding online exchange of communications and information, and creating new channels for commerce.

B.   Domain names: Coming into the mainstream

Domain names have evolved from an obscure technical detail of an experimental network into a well-known and widely used feature of the modern Information Society. As with a number of other typical e-commerce terms which would not have been commonly understood just 10 years ago, except perhaps among a small group of Internet engineers, the term "domain name" is now widely used in many countries and in different languages.[8] Many people generally know what a domain name is and how it can be used. Use of the term, however, is not universal but reflects the same demographics as correspond more generally to the penetration of ICT and e-commerce worldwide.[9]

Hand in hand with this increasing recognition of domain names, registrations of the latter have grown at a rapid rate. As of the first quarter of 2002, just over 30 million domain names had been registered worldwide,[10] compared with only 645 in July 1991 and 150,000 in late 1995.[11] The weekly volume of new registrations in 1999 was about 21,000,[12] and the number of domain name registrations overall is continuing to grow.[13] This growth has recently been fuelled by the addition of new top-level domains (such as .biz or .info), discussed below.

1. Domain names and early Internet communication

(a) Defining a domain name

As background, we can review the specific meaning of the term "domain name". Strictly speaking, an Internet domain is the name of a specific host that maintains a website and related sub-sites. A domain name consists of a string of alphanumeric ASCII characters, separated by periods, which is used to find a host on a network. For example, typing www.unctad.org into an Internet browser's address box and pressing the return key will bring a user to the UNCTAD website. In addition, every host on the Internet has a unique address, which is a string of numbers called its "IP address", just like a telephone number. The IP address, like the domain name, is usually expressed in dot notation, consisting of a numerical sequence that contains as many as 12 numbers in 4 blocks, separated by periods, e.g. 128.121.4.5.[14] Thus, each domain name can be mapped against a unique IP address. Domain names

were established because, with the increase in the number of Internet hosts, it became difficult to log on using long and difficult- to- remember IP addresses. The process of looking up the specific host's IP address that corresponds to the entered domain name is called "name resolution".

The infrastructure and technology used for name resolution is the Domain Name System. The DNS allows network users to easily locate and connect to host computers around the world. Technically speaking, the DNS can be described as a distributed, replicated, data query service chiefly used on the Internet for translating specific domain names into their underlying Internet Protocol (IP) numbers, which serve as the routing addresses for specific host computers located on the network.

Of course, domain names, as discussed below, have also taken on a second, overriding and non-technical function, serving as common business and personal identifiers.[15] This function is much more in line with the widely held understanding of a domain name, particularly as its technical functions are, as with so many other user-friendly computer applications, invisible to the user. Thus, with the explosion of interest in the Internet following the advent of the World Wide Web domain names have come to be considered a valuable part of many companies' brands.

Domain names can be expected to continue to play an important role in business and for other non-commercial, public or personal purposes. This is particularly true since a domain name effectively serves, at one and the same time, as a branding or identification device for a business, an organization or a person, and as the functional mechanism to locate its website. The domain name has thus evolved to present a novel and potent characteristic by combining these two features into one user-friendly label. As the use of ICT and e-commerce spreads in developing countries, these same powerful features should serve to give domain names equal relevance for both commercial and non-commercial uses in those countries. As discussed below, policy decisions are required in relation to the national country code top-level domains (ccTLDs) in order to foster not only ease of registration of domain names but also overall confidence in the relevant ccTLD space so that domain names can be as useful as possible.

(b) The Internet's early development[16]

The early users of the Internet consisted largely of a group of volunteers and academics, some of whom received funding from the United States Government. These pioneers experimented with establishing communications between the computers connected to their networks. In 1969, when the Internet's predecessor, the Advanced Research Projects Agency Network (ARPANet), was established, it consisted of just four host computers connected to the network. It was small enough that the users generally knew how to locate and communicate with each other; identification of the network's computers did not cause difficulties.

Dr. Jon Postel, a computer scientist at the University of Southern California's Information Sciences Institute (ISI), is regarded as a pivotal figure in the development of the Internet's address system. For many years, he played a central role in the technical management and administration of the Internet, acting as director of the Internet Assigned Numbers Authority (IANA), again a United States financed entity. He was one of the small group of computer scientists who created the ARPANet, and worked on the development of early Internet protocols and standards.[17] The Request for Comments (RFC) 1591, authored by Dr. Postel in March 1994, addresses the "Domain Name System Structure and Delegation" and is regarded as having set out the basic principles for the DNS. Dr. Postel's early stewardship of the Internet address system is credited with providing the foundations to enable the fast-growing high-speed international communication network to eventually connect computers throughout the world.

In 1974, a further key technical advance was the development of a new host-to-host-protocol, introduced by two other Internet engineers, Bob Kahn and Vint Cerf, called the Transmission Control Protocol (TCP). It was designed to meet the needs of an "open" architecture network (as compared with a closed, private computer network) and eventually, in 1978, it was broken into two parts, TCP, which was charged with breaking up and reassembling the data messages sent across networks, and IP (Internet Protocol), which was charged with the routing of the data. The standard, now central to Internet communications, thus became known as TCP/IP.

Next in the development of the DNS, in 1983, another engineer, Paul Mockapetris of ISI, created a naming system which mapped IP addresses to easily remembered names. Each computer was allocated to a unique domain name and the computer's IP address would be converted into this name, and vice versa. When the user typed in the name, it would be automatically changed to the appropriate IP address and the corresponding computer on the network could be located. Furthermore, under the new system, no single machine maintained information on all the host machine names. Instead, each administrator maintained the information on its own hosts, and a central authority kept records on the location of this information, thus establishing the distributed nature of the system.

The Domain Name System had been created.

Following these formative developments, Network Solutions Inc. (NSI), a privately owned company located in Virginia in the United States, was contractually given the right by the United States Department of Commerce to register domain names on behalf of the public.[18] In 1995, NSI was allowed to begin to charge a fee for DNS registrations. NSI registered domain names in what are known as the generic Top Level Domains (gTLDs) on a first-come-first-served basis. The first seven of these gTLDs, established in 1984, are well known: .com, .org, .net, .gov, .edu, .mil and .int.

In response to a United States Department of Commerce White Paper published in 1998, the Internet Corporation for Assigned Names and Numbers (ICANN) was created the same year. Regarding the management of the DNS, ICANN's core mission is to continue the work of IANA, although in a more formalized and globally representative framework in order, in its own words, "to ensure the views of all the Internet's stakeholders are taken into account in carrying out this public trust".[19] In consequence, ICANN assumes responsibility for overseeing the technical coordination of the DNS. As part of this function, it approved the introduction of seven new gTLDs in November 2000, namely .aero, .biz, .coop, .info, .museum, .name and .pro.

As domain names have become increasingly important for a variety of uses, new legal issues have presented themselves, the most important of which is the potential conflict between domain name registrations and trademark rights. This issue is addressed fully below, and represents a significant recent chapter in the history of the DNS.

An obvious yet important aspect of this brief DNS history, relevant even today as discussions continue

through ICANN on how to implement an international structure for oversight of the DNS, is that much of the early critical planning and work took place in the United States, sometimes with government assistance. This United States influence continues to be strong, as reflected for example in the geographical placement within the United States of most of the strategic DNS "nameservers", which are important to the overall functioning of the DNS (see below). While the United States Government has facilitated efforts to secure more international participation and input into decisions concerning the DNS, developing countries should be encouraged to become more involved so that their concerns and requirements in relation to the DNS can be heard and advanced.

Chart 3
Authority concept of the DNS
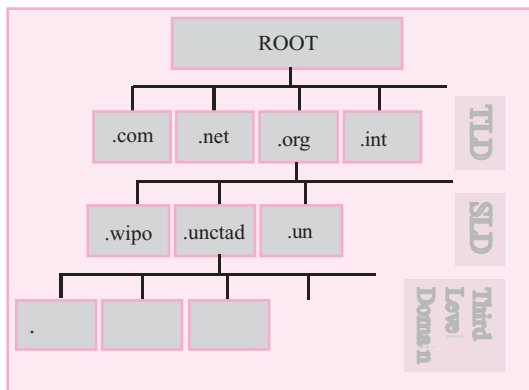
(c) Functioning of the DNS

When the DNS was introduced, an extremely important concept was the dividing of the single list (managed by ISI) into hierarchical layers or "domains", thus introducing at one and the same time the concepts of authority and decentralized functioning. Under this system, higher-level domains have authority over the sub-domains beneath them. For example, in the (fictional) domain of www.ecommerce.unctad.org, the .unctad domain would have authority over .ecommerce. This domain concept can be expressed by means of an inverted tree diagram, in which everything is subordinate to the "Root" (see chart 3) and each sub-domain is subordinate to the domain above it. Keeping in mind the authority concept, domain names are read from right to left. In the example of www.ecommerce.unctad.org, the .org constitutes the so-called top-level domain (TLD); .unctad is called the second-level domain (SLD); and .ecom-
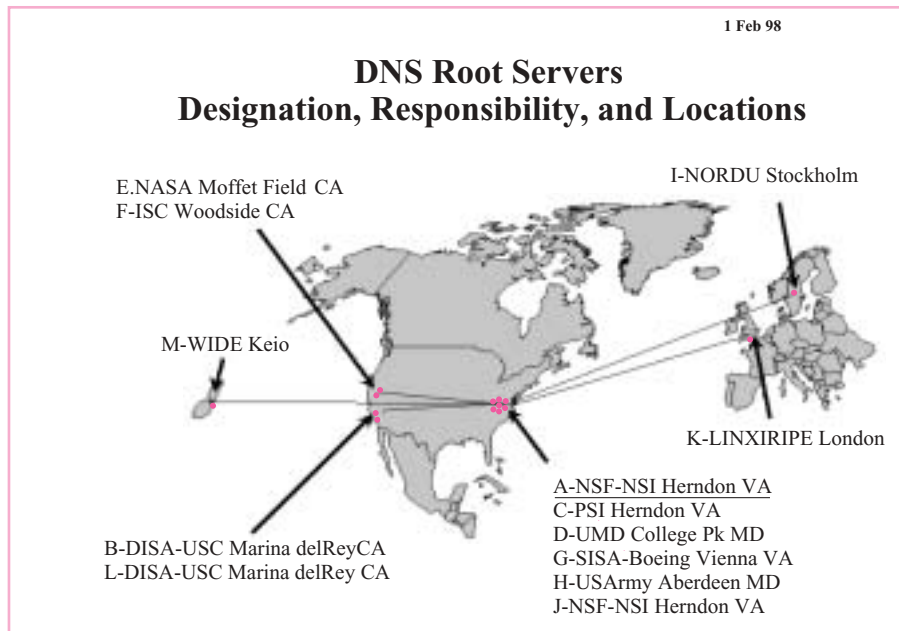
merce constitutes the third-level domain. This designation of levels is the same irrespective of the level's content. Thus, the SLD can represent the name of the business, organization, individual or something else. Rules applicable to the higher-level domain are usually to be incorporated into the next sub-level, along with any rules which that sub-level may introduce.[20] This allows for the decentralized (by sub-domain) administration of the DNS. Practically, this has permitted the creation of a private system of management for the DNS, in which obligations can be imposed by contract from one domain level to the sub-domain.

From a technical perspective, at the heart of this DNS system are 13 special computers, called root servers, which are the ultimate technical infrastructure of the DNS and are of major importance for the functioning of the Internet. They are coordinated by ICANN and are distributed around the world, with ten located in the United States, two in Europe and one in Japan (see chart 4). All 13 contain the same vital information – this is to spread the workload and back each other up. The root servers contain the IP addresses of all the TLD registries – both the global registries such as .com or .org, and the country-specific registries such as .fr (France) or .cn (China). This is critical information; if it is not 100 per cent accurate or if it is ambiguous, it might not be possible to locate a website on the Internet.

The "A" root server constitutes the most important authority of the system. It is operated by Verisign. This A-Server contains the authoritative copy, stating which nameservers hold the relevant information for each of the top-level domains. The authoritative copy is the one that all other root servers trust to be authentic and contains the most complete and most updated list (the so-called zone file) of the TLDs. This is why the other root servers, which are operated by several independent organizations,[21] direct their requests to, and copy their information from, the A-Server.[22]

This technical structure shows that the DNS, while working with a decentralized infrastrucure and administration, is nevertheless based on a root server system which has a centralized and authoritative hierarchy. The system has been designed to ensure predictable look-up results from anywhere on the Internet, a concept known as "universal resolvability". It is a critical design element of the DNS. This is similar to the telephone system: when a telephone number is dialled, it rings at a particular location because there is a central numbering plan ensuring that each telephone number is unique. If telephone numbers or domain names

Chart 4
Authoritative root server system

DNS Root Servers
Designation, Responsibility, and Locations

1 Feb 98

E.NASA Moffet Field CA
F-ISC Woodside CA

I-NORDU Stockholm

M-WIDE Keio

K-LINXIRIPE London

B-DISA-USC Marina delReyCA
L-DISA-USC Marina delRey CA

A-NSF-NSI Herndon VA
C-PSI Herndon VA
D-UMD College Pk MD
G-SISA-Boeing Vienna VA
H-USArmy Aberdeen MD
J-NSF-NSI Herndon VA

were not globally unique, phone calls or e-mail intended for one person might go to another. Without uniqueness, both systems would be unpredictable and therefore unreliable.[23]

In this context, it is worth noting that some private companies have recently introduced new gTLDs which can be accessed by "alternative roots". They are not tied into the single A-root hierarchy discussed above, although some operators claim they are being unfairly excluded. Problems can be caused by these alternative roots, including lack of reliability. Those purchasing domain names in these pseudo-TLDs may not be aware of the consequences arising from lack of universal resolvability. As noted above, if the DNS must make a choice between two identical domain names with different IP addresses (i.e. one in the A-root system and one registered under an alternative root), the DNS would not function properly. These problems are insignificant so long as the alternate roots remain very small; however, if they should ever attract many users, the problems would become much more serious, and could affect the stability and reliability of the DNS.[24]

Authorities in developing countries should be aware of the architecture and functioning of the DNS, so that they can make appropriate choices in relation to international policy, as well as implementation of national policy. Each country should be concerned about

establishing a reliable DNS environment, so that predictable look-up results can be achieved by entering a domain name, just as dialling a telephone number should permit completely reliable contact. Adhering to universal resolvability will promote confidence in online communications, allowing countries to take full advantage of the Internet as a resource for information, education and commerce.

More information explaining the operation of the DNS is provided in annex A.

2. Top-level domains TLDs : Generic and country code TLDs, and new multilingual variations

As noted, the DNS operates on the basis of a hierarchy. Although there is no difference functionally, the top layer consisting of TLDs is divided into two categories: generic TLDs (gTLDs) and country code TLDs (ccTLDs). Both gTLDs and ccTLDs are an integral part of the Internet infrastructure, promoting global interoperability in the DNS.

(a) gTLDs

The gTLDs are top-level domains which are not associated with any country, territory or geographical area. Therefore, policy and planning decisions regarding

their operations generally do not fall within the purview of a particular Government, but are left to the particular sponsoring organization or registry operator, acting under the auspices of ICANN.[25] As noted above, initially there were seven gTLDs, three of which are "open" or unrestricted (.com, .net, .org) and the other four of which are restricted (.edu, .gov, .mil and .int). In November 2000, seven additional gTLDs were introduced by ICANN, notably, .aero, .coop, .biz, .info, .museum, .name, and .pro. Thus far, five of the new gTLDs are operative and accepting domain name registrations.[26]

The gTLDs commonly use extensions to denote the purpose intended for the TLD. The .com TLD is intended for commercial entities, .edu is reserved for educational purposes, .net is for computers of network providers and .org is for charity or non-profit organizations. However, today, only the .int (international organizations), .gov (United States Government) and .mil (United States military) domains follow strictly their original restricted policies for registration. As for the others, the limitations have never been enforced and their categories have become blurred with time. The .com TLD, favoured by many as the domain name registry of choice because of its wide name recognition, has evolved into a catch-all premium registry.

The newly introduced gTLDs also follow registration policies based on function and are intended to be limited to certain groups of individuals, companies or organizations.[27] The .biz domain is reserved for business or commercial purposes, whereas .name is limited to use by individuals. Registration for the .pro TLD will be limited to professionals – accountants, lawyers and physicians. The .aero, .coop and .museum TLDs are reserved for the air transport industry, cooperatives and museums, respectively. The only new gTLD that is intended to be used in a completely unrestricted manner is .info. However, only the future will show whether the registration limitations of the other TLDs are in fact applied rigorously. In this context, it is interesting to note that the registry operator for the new ICANN-accredited .biz TLD has implemented a Restrictions Dispute-Resolution Policy (RDRP), under which any third party may file a complaint about the registration or use of a domain name which is in violation of the domain name registration restrictions.[28]

Table 10 sets out the gTLD, sponsoring organization and restrictions, if any, applicable to the 14 gTLDs.

The seven new gTLDs were introduced in order to expand the generic name space available for registra-

Table 10
Sponsored gTLD agreements

gTLD	Open/restricted	Sponsor
.aero	Reserved for members of the air transport industry	Société Internationale de Télécommunications Aéronautiques (SITA)
.biz	Restricted to businesses	NeuLevel, Inc.
.com	Open	VeriSign Global Registry Services
.coop	Reserved for cooperative associations	Dot Cooperation LLC
.edu	Reserved for degree-granting educational institutions of higher education	Educause
.gov	Reserved for the United States Government	US General Services Administration
.info	Open	Afilias Limited
.int	Reserved for organizations established by international treaties between Governments	IANA .int Domain Registry
.mil	Reserved for the United States military	US DoD Network Information Center
.museum	Reserved for museums	Museum Domain Management Association
.name	Reserved for individuals	Global Name Registry
.net	Open	VeriSign Global Registry Services
.org	Open	VeriSign Global Registry Services
.pro	Reserved for certified professionals	RegistryPro, Ltd

tion of new domain names, and to promote competition in gTLD registration activities. While .info or .biz may be considered similar in design to the existing open gTLDs (i.e. .com, .net and .org), the others such as .aero, .coop and .museum introduce a new element of differentiation, which can serve as an instrument for sending signals to the Internet user while advancing the policy objectives of these registries.

As new gTLDs are introduced, developing countries have an opportunity to take advantage of the new name space becoming available, although certain commentators have suggested that many of the useful names in the .com TLD have already been registered. Groups in developing countries may also, in the future, wish to sponsor new gTLDs that would support their own objectives, in view of the market-signalling power that a TLD can exhibit.[29] Of course, the ccTLD space, discussed below, is the natural starting point for serving the national goals and policies of each country. Furthermore, the new space and dimensions that will be brought into being by enabling the registration of multilingual domain names (discussed below), which reflect the linguistic diversity of Internet users, mean that the potential resource space for domain names, even in the existing gTLDs, is greater than many may have previously believed.

(b) Country code top-level domains

Country code TLDs (ccTLDs) are two-letter domains – such as .ag (Antigua and Barbuda), .lk (Sri Lanka), .pa (Panama) and .sn (Senegal) – which correspond to a country, territory or other geographical location. They bear two-letter codes based on the official list maintained by the International Organization for Standardization (ISO) in its International Standard 3166. In that connection, ICANN, in its role of coordinator of the delegation of codes for ccTLDs, issued a resolution in September 2000 reaffirming that

> "alpha-2 codes are delegable as ccTLDs only in cases where the ISO 3166 Maintenance Agency, on its exceptional reservation list, has issued a reservation of the code that covers any application of ISO 3166-1 that needs a coded representation in the name of the country, territory or area involved."[30]

Currently, there are 243 ccTLDs.

The rules and policies for registering domain names in the ccTLDs vary significantly. Although these domains were originally envisioned as being limited to domestic use,[31] the registration policies of various

ccTLDs have evolved differently. The registry for each ccTLD sets its own policies for domain name registration. Some ccTLDs are reserved for use by citizens or local entities within a particular country,[32] while others are operated in an open and completely unrestricted manner. In fact, there are approximately 80 open ccTLD registries, in which any organization or person can register a name generally on a first-come-first-served basis. Thus, for example, domain names can be registered by anyone in the .to, .tm or as. ccTLDs, corresponding to Tongo, Turkmenistan and American Samoa respectively.

Generally speaking, the ccTLD registries are operated by local administrators in each country. Initially, these administrators were usually drawn from technically skilled personnel, sometimes associated with an academic institution. Today, the administrators of ccTLDs come from the private sector or educational institutions, while others are under governmental control.

It is not uncommon that for certain ccTLDs the local administrator has introduced functional categories similar to those available in the gTLDs, but residing at the level of the second-level domain (SLD) in the DNS. The registration of a domain name by an interested person, therefore, takes place at the third-level domain. For example, the registry for the United Kingdom's .uk ccTLD space,[33] Nominet.UK, has implemented the following SLDs in which domain names can be registered by users:

- ac.uk (reserved for academic institutions, e.g. www.oxford.ac.uk for Oxford University);

- *co.uk* (reserved for commercial enterprises – the largest SLD under *.uk*);

- *.gov.uk* (reserved for the United Kingdom Government);

- *me.uk* (open to individuals);

- *org.uk* (open to non-commercial organizations);

- *net.uk* (reserved for Internet service providers);

- *ltd.uk* and *plc.uk* (reserved for registered company names only);

- *sch.uk*. (reserved for schools).

In Sweden, as another national ccTLD example, certain periodical publications can be registered under the

press.se SLD, while private individuals can register a domain name under the pp.se SLD.[34]

Early on, any agreement between the ccTLD operators and IANA (as the organization providing technical oversight of the DNS) to implement coordinated policies for the Internet was informal at best. In many instances, although IANA had introduced a designated two-letter country code into the A-root, there were continuing disagreements about who should be the authorized administrator of a particular ccTLD.[35] As the Internet has spread and grown in commercial importance, many commentators, businesses, Governments and users of the Internet have concluded that a more formal set of agreements should be established.

One of ICANN's principal activities thus has been to work with the other organizations involved in the Internet's technical coordination to formally document their role within the ICANN process and their (and ICANN's) commitments to implement the policies that result. This focus has resulted in agreements between ICANN and a number of different DNS players, including VeriSign, formerly Network Solutions, which operates the .com, .net and .org TLDs; the companies responsible for operating the new 'unsponsored' TLDs (.biz, .info and .name); the organizations establishing the 'sponsored' TLDs (.aero, .coop and .museum); over 150 ICANN-accredited registrars; the regional Internet registries; and the Internet Engineering Task Force.

Since 2000, ICANN has also been working with managers of ccTLDs to formalize and document their relationship with it. These relationships can be more complex, because of the varying circumstances (in terms of type of organization, policies, language, culture, legal environment and relations with Governments) of different ccTLDs and the organizations that operate them. The ICANN Government Advisory Committee (GAC), an ICANN advisory body composed of representatives of Governments, has been instrumental in this area. Through several communiqués provided to the ICANN Board of Directors, the GAC has established the following positions:

- The Internet naming system is a public resource and the management of a TLD Registry should be in the public interest.

- Accordingly, no private intellectual or other property rights should inhere in the TLD itself

or accrue to the delegated manager of the TLD as the result of such delegation.

- The delegation of a ccTLD Registry (to a particular operator/manager) is subject to the ultimate authority of the relevant public authority or Government.

These positions were formalized in a GAC document entitled "Principles for Delegation and Administration of Country Code Top Level Domains", which was published in February 2000. This document provides, in the relevant part, that:

> "The delegee of a ccTLD is a trustee for the delegated domain, and has a duty to serve the residents of the relevant country or territory in the context of ISO 3166-1, as well as the global Internet community. . . Its policy role should be distinguished from the management, administration and marketing of the ccTLD. These functions may be performed by the same or different entities. However the delegation itself cannot be sub-contracted, sub-licensed or otherwise traded without the agreement of the relevant government or public authority and ICANN."

ICANN recently introduced a "Model ccTLD Sponsorship Agreement", which aims at regulating the rights and obligations between ICANN and ccTLD administrators, and also defines the role of the governmental authority in the ccTLD environment.[36] For ICANN's part, the Sponsorship Agreement provides that ICANN will maintain a stable, secure and authoritative database of relevant information about ccTLDs maintained in the "Authoritative Root-Server System". Thus, for a particular ccTLD, the Authoritative-Root Database will contain all relevant information to ensure its proper technical functioning, including information about the ccTLD sponsoring organization (with administrative and technical contacts) and certain other technical information (i.e. regarding the ccTLD nameservers). The ccTLD sponsoring organization, on the other hand, agrees to use its best efforts to operate the ccTLD in a stable and secure manner, so that domain names registered within the ccTLD are reliably resolved for users throughout the Internet. As regards the relevant governmental authority, the Sponsorship Agreement mainly emphasizes its responsibility for the public interest on behalf of the Internet community in the country in question, and coordinating in relation to the ccTLD administrator's management of the ccTLD.[37]

Importantly, the Sponsorship Agreement would also require ccTLDs to make a financial contribution to ICANN's cost of operations. For example, an appendix to the Agreement provides that for the year ending 30 June 2002, the maximum fixed annual contribution is $5,000, with this amount set to automatically increase by 15 per-cent on 1 July of each year.[38] It may be increased by a greater amount if new or revised ICANN policies are established. The appendix further provides that the total amount of fees paid by all TLD sponsors and registry operators that have sponsorship agreements with ICANN cannot exceed the annual cap of $5,500,000, but this annual cap will also increase by 15 per-cent each year. For developing countries, particularly with ccTLD registries in which there are very few domain name registrations, these fee obligations to ICANN can represent a significant financial burden.

Aside from the ICANN Sponsorship Agreement, other issues for ccTLDs concern the environment for competition in respect of domain name registry and registrar services. These services may be structured quite differently, depending on the particular policies in the country concerned. Registry services relate to organizing, managing and administering the ccTLD name space – including the central authoritative database for the ccTLD and associated public query services – in a secure and reliable manner. Registrar services, on the other hand, are directed towards interacting with customers, offering these "registrants" services for registering their domain names in the ccTLD.

In Germany, for example, the administrator of the .de ccTLD[39] in addition to being the operator of the registry, offers services as a domain name registrar. However, the administrator actually recommends that users register their domain names with other registrars and only offers its registration services at a price which is less competitive than the prices offered by other registrars in Germany. Some ccTLD administrators act as both the sole registry and registrar for the relevant country domain space, especially in those countries where domain names have not yet proved to be so popular. Still other ccTLD administrators, as in Germany, have announced their intention of introducing a more competitive environment for domain name registration activities within their ccTLD. This is the case for the government-owned Singapore Network Information Centre (SGNIC), administering the .sg ccTLD. Currently, SGNIC maintains the registry for .sg and is also the only organization acting as registrar to accept domain names registrations in this ccTLD. Soon, how-

ever, other companies will be invited to become accredited registrars, thus competing at the registrar level for domain registration business in Singapore. SGNIC will, however, maintain control of the registry.[40]

Given the technical requirements, it is widely accepted that it would be extremely difficult, and would put DNS reliability at risk, to introduce competition at the level of registry services for a particular TLD. Thus, two different entities should not share registry services for a given TLD. However, competition among registrars is now common. As noted above, there are more than 150 ICANN-accredited registrars competing around the globe to accept domain name registrations and offer related services in the gTLDs. Further information about the market for domain name registration services is provided in section B.3 below.

In developing countries, ccTLD administrators can develop appropriate policies that meet the needs of their community, satisfying any relevant legal, cultural, economic, language or other requirements. There is no single model for structuring a ccTLD that would fit the needs of all countries or territories. The policies for each ccTLD should be carefully formulated with all of these particularized factors in mind, with the overall goal of promoting access to and use of the Internet. In order to illustrate the different registration policies that may be implemented by different ccTLDs operators, the policies developed for the Republic of the Congo (.cg) are briefly highlighted in box 1.

As a further example of new developments in this area, the European Union on 30 April 2002 published a new Regulation to "implement the .eu country code Top Level Domain (ccTLD) within the Community".[41] The .eu ccTLD was first proposed as part of the EU's e-Europe initiative to accelerate the development of electronic commerce.[42] The EU believes that the new .eu ccTLD will "accelerate the benefits of the information society in Europe as a whole", and, in particular, provide greater visibility for the EU Internal Market on global information networks, while increasing choice and competition.[43] Furthermore, it is viewed as a positive factor that the infrastructure accompanying the implementation of the .eu ccTLD, including DNS nameservers and the registry database for .eu, will be located in the EU and will therefore "affect the topology and technical infrastructure of the Internet in Europe".[44] It is envisaged that the European Commission will establish a fair selection procedure to designate the entity that will act as the registry for .eu. The Regulation also specifies that the

Box 1

Republic of the Congo (.cg) ccTLD

The administrator for the *.cg* ccTLD is the Network Information Center (NIC) of the Republic of the Congo. It has posted its registration policies on the web at www.nic.cg. The *.cg* NIC serves both as the registry and the registrar for domain names registered in this space. It has established the following policies:

- Registration is free of charge for the citizens or lawful residents of Congo (may require copy of passport or residence permit to be produced).

- A company or non-governmental organization registered and operating in the country will also qualify for free domain name registration services.

- Legal institutions, government ministries, churches and other authorities of Congo have the highest priority with regard to the right to free domains.

- Foreign entities are not precluded from registering in the *.cg* ccTLD; however, these entities are charged a registration fee. The fee is currently 550 Swiss francs for the first year, and 350 Swiss francs for each year thereafter.

- While domain names may be registered directly in the SLD under *.cg* (e.g. unctad.cg), the domain name must have a minimum of three characters. Two-letter domain names may be registered only with special authorization.

- The – *gov, net, edu, ac, com, co, int, mil* - sub-domains are considered restricted.

- The use of the misleading suffix *.cg* is strongly discouraged: users are reminded that .CG stands for the Republic of the Congo and for nothing else.

registry will operate on a non-profit basis and will not itself act as a registrar. The .eu initiative is a relevant example for developing countries of how a ccTLD can be implemented, even on a regional basis, to broadly promote the objectives of increased Internet usage and e-commerce activity, as well as regional recognition and integration.

Additional resources for operating a ccTLD registry are becoming more widely available for the managers of ccTLDs. Developing countries can take full advantage of these materials as they determine their own policies. For example, the ccTLD Constituency of ICANN, a group representing ccTLD administrators in the ICANN process, has produced "Best Practice Guidelines for ccTLD Managers".[45] The Guidelines provide that (a) ccTLD registries should ensure that there are standard agreements for domain name registrants setting out the expectations and obligations of each party; (b) ccTLD Managers should be fair to all eligible registrants requesting domain names; (c) policies and procedures may vary from country to country owing to local customs, cultural values, local policies, law and regulations; (d) the policies and procedures for the use of the ccTLD should be made available for public inspection; (e) ccTLD Managers should have a policy on privacy and that policy should be published;

and (f) ccTLD Managers should define and publish their domain name dispute resolution policies and procedures in consultation with the Local Internet Community (making judgements in relation to disputes between third parties and domain name registrants is outside the scope of the ccTLD Manager's duties).

The World Intellectual Property Organization (WIPO) has also published a useful guide, the "WIPO ccTLD Best Practices for the Prevention and Resolution of Intellectual Property Disputes".[46] This statement of best practices is intended to establish a set of minimum standards for the protection of intellectual property in the ccTLDs, particularly in respect of open ccTLDs (i.e. ccTLDs in which there are no restrictions on the persons or entities registering). The WIPO Best Practices focus on three elements:

- *Registration agreement*: a prerequisite for the proper management of a ccTLD is that the rights and obligations of the domain name registrant and the ccTLD administrator should be reflected in a formal registration agreement.

- *Contact details*: the collection and making available of domain name registrant contact details is

important for facilitating informal steps or initiating formal procedures aimed at redressing intellectual property infringements.

- *ADR:* ADR procedures for resolving disputes between domain name registrants and trademark owners can provide an efficient, fair and inexpensive approach.

WIPO has also established a comprehensive "WIPO Ecommerce ccTLD Database", which contains links to 243 ccTLDs and provides information about their registration agreements, WHOIS services and alternative dispute resolution procedures.[47]

One further development of significance to ccTLDs is the formation of regional ccTLD groups, which have developed over the last several years as a resource for ccTLD managers and to more effectively voice concerns that regional ccTLDs operators may have. Developing countries may find that the information and contacts available to them through these organizations will be extremely helpful. A number of them also participate actively in the ICANN process.

The African Top Level Domains (AFTLD) project, for example, was established for ccTLD registries in Africa and the Middle East to cooperate and engage in concerted action on issues of common concern. The AFTLD website provides further information.[48] AFTLD lists its objectives as follows:

- Representing the interests of the African ccTLDs, including the neighbouring islands around the African continent;

- Promoting communication and cooperation between ccTLDs' managers;

- Informing the African Internet community about the ICANN process through an awareness and outreach programme; and

- Providing a common address where information about African ccTLDs can be obtained.

Box 2 provides information about relevant ccTLD organizations and forums.

These resources, as well as others, show that an increasing amount of information is becoming available to developing country experts to assist in the formulation of an appropriate approach for management of a country domain space. Information concerning registration policies, as well as model implementation agreements, can also be found online, through the ICANN website.[49]

Box 2

TLD forums

• African Top Level Domains (AFLTLD)	www.aftld.org
• AfriDNS	www.afridns.org
• Asia Pacific Top Level Domain Forum (APTLD)	www.aptld.org
• Latin American & Caribbean Country Code TOp Level Domain Organization (LACTLD)	www.lactld.org
• North Amercian Top Level Domain Organization (NATLD)	www.natld.org
• Council of European National Top-Level Domain Registries (CENTR)	www.centr.org
• International Association of Top Level Domains	www.iatld.org
• World Wide Alliance of Top Level Domain-names	www.tld.org

(c) Multilingual ("internationalized") domain names

A new development, which stands side by side in importance with the expansion of the gTLD space and the continuing development of ccTLDs, is the emergence of multilingual or "internationalized domain name" (IDN) technology. This refers to DNS technology that will allow Internet users – for example, those whose native language is not English[50] – to use lan-

guage character sets other than the Latin (also described as Roman) ASCII set,[51] which is today the only set (including letters, numerals and hyphens) that can be used for domain names. Thus, with the implementation of IDN technology, domain names will be able to be expressed, for instance, in Arabic characters.[52] There are several commercial initiatives under way to make domain names available in character sets other than the Latin ASCII.[53] Meanwhile, a key standards-setting body for the Internet, the Internet Engineering Task Force (IETF), is actively discussing the appropriate technology and protocols which should be adopted as a standard in this area.[54]

These new developments have an obvious relevance for developing countries. There is broad recognition that IDNs offer the potential to increase Internet use for a significant segment of the world's population, whose native language is written in non-Latin scripts. For example, a person in China, rather than searching for a term in the English language (using the Latin ASCII script) to express an identity, brand or concept in a domain name, can use the IDN technology to choose a domain name in a Chinese character script. When implemented, the IDN technology will make possible the natural logic of allowing one to express oneself in one's own language, while also bringing new registration space to the DNS.

These IDN developments have been followed closely by ICANN. It has established an Internationalized Domain Names (IDN) Committee. The ICANN Board of Directors, in a resolution dated 25 September 2000, recognized "that it is important that the Internet evolve to be more accessible to those who do not use the ASCII character set". The resolution emphasized, however, that

> "the internationalization of the Internet's domain name system must be accomplished through standards that are open, non-proprietary, and fully compatible with the Internet's existing end-to-end model and that preserve globally unique naming in a universally resolvable public name space."

More recently, on 16 April 2002, ICANN took the additional forward-looking step of publishing a "Discussion Paper on Non-ASCII Top-Level Domain Policy Issues".[55] This paper is intended to begin the discussion of issues relevant to the introduction of new TLDs which, like the IDN domain names discussed above, may themselves appear in a non-Latin-character script. In time, for example, we may expect that a non-ASCII TLD, consisting of Japanese characters

semantically associated with the recognized geographical unit of Japan (.jp), could be introduced into the DNS. As the Discussion Paper states, the ICANN IDN Committee's

> "current thinking focuses on extending to the IDN namespace existing policies and concepts for the creation of ASCII generic TLDs (gTLDs) and ASCII country-code TLD (ccTLDs), which have been developed and refined over time, while giving due consideration to additions and variations in policy to take into account unique factors related to the use of non-ASCII characters within the DNS."[56]

In addition, the Committee has generally agreed that the core purpose for introducing non-ASCII TLDs "would be to make the DNS service easier to use for Internet users whose native languages include non-ASCII characters."[57]

These new developments for the DNS are timely. The Internet is rapidly evolving from its predominantly English language roots to reflect the creativity, expression, communication and business interchange which occurs in other languages. It is estimated that by 2007, Chinese will be the most common language used on the Internet. Such a development would merely reflect the nature of communications prevailing offline, in which 92 percent of the world's population speaks a primary language other than English.[58]

While it is likely that it will still take time, the roll-out of IDN technology should provide significant benefit to developing countries, increasing the intuitive use of domain names and improving navigation of the Internet. As discussed above, there should also be opportunities to introduce new IDN top-level domains, which may become very popular within certain regions or countries. The policies to be associated with these new TLDs, as discussed in section B.2(b) above concerning ccTLDs, can be developed in a manner which is appropriate to the relevant governmental, legal, cultural or other requirements.

3.   Competition in domain name registration services

ICANN has accredited a geographically diverse set of approximately 150 companies as competitive domain name registrars for the gTLDS (specifically for .aero, .biz, .com, .info, .name, .net and .org).[59] About 80 of them are currently operating to receive domain name registrations, while others are accredited but have not

yet commenced operations. A complete listing of accredited organizations is available on the ICANN website.[60]

It is important that the overall structure of the domain name services market provide a competitive environment for companies offering services. The first-come first-served, highly automated and efficient nature of the registration system has allowed the tremendous growth that has taken place, while acting as the means of preserving universal connectivity on the Internet.[61] Initially, however, just one company, Network Solutions, acted as both the registry and registrar for the popular .com, .net and .org gTLDs. Thus, Network Solutions was a single historical provider, which had enjoyed a monopoly granted by the United States Government over new domain name registrations and renewals.[62]

With the separation of functions between registry and registrar, and the changes that have been brought about through the ICANN process over the last few years, the situation has evolved significantly, as noted above with the introduction of competition among registrars. At the same time, however, it is a widely held view that the registry function in the DNS for each TLD presents a natural monopoly situation (i.e. administering the centralized and authoritative database for the particular TLD), which cannot, from a technological perspective, be shared among competing companies. Thus, while some level of competition can be achieved among the registries for different gTLDs, there cannot be two companies to operate the database and carry out administrative functions for a particular TLD. The separation of the registry from the registrar functions has permitted competition at the registrar level among companies accepting domain name registrations from end-customers. Nevertheless, as more companies have become involved – some operating as TLD registries, others acting as registrars, and still others assuming both functions – the environment for competition within the DNS has become more complex. This is an area in which continued vigilance and oversight are required.

(a) ICANN accreditation

In order to become accredited by ICANN, a prospective registrar must satisfy a number of business, financial and technical requirements. These requirements are described in detail on ICANN's website.[63] The company must complete and submit an ICANN Registrar Accreditation Application, pay a non-refundable $2,500 fee and eventually sign a Registrar Accredita-

tion Agreement with ICANN. The technical capabilities, for example, should be designed to ensure security and continuity, irrespective of whatever might happen to a particular registrar's business – this is vital to the stability of the Shared Registration System. Once accredited, the company will be required to pay annual accreditation fees of $4,000 for the first and $500 for each additional TLD in which it will be accepting domain name registrations. It will also be required to pay quarterly fees representing a contribution to ICANN´s operating costs, which will be based on the registrar´s share of overall domain name registrations in the TLDs for which it is accredited. An applicant will be required to demonstrate that it has capital of approximately $70,000 or otherwise show that it has the financial resources necessary for carrying on the business.

An organization seeking to begin registrar operations will also be required to enter into several contracts with the operators of the gTLD registries. One of the reasons for this is the licensing of the proper technology (software) to allow interoperability between the registrar and registry operators. In addition, the registrar will be required to comply with various rules and requirements established by the registry operator (i.e. imposed through the chain of contracts mentioned above). For example, in dealing with VeriSign, the core agreement is the Registry-Registrar-Agreement (RRA).[64] This contract provides that registrars will pay VeriSign $6 for each domain name registration and annual renewal. The registrar will also be required to provide payment security, which is used to secure the registrations that the registrar performs each month.[65]

It is only after a prospective registrar has met all these requirements that it is allowed to begin operations. Thus, the technical, legal and financial requirements are not insignificant. The system appears to be working for the 80 registrars already in operation; however, if the volume of new domain name registrations as well as renewals declines, new stresses may be imposed on the system. Organizations which have been accredited by ICANN but are still not actually operating may be weighing the pros and cons of beginning registration services, in view of the additional costs that this step entails.

(b) Price competition for domain name registration services

In order to evaluate the competitive system for registrars, it is useful to review domain name market infor-

mation, as well as the prices that customers are being charged to register domain names.

Concerning the first issue, recent statistics show that the overall market volume for domain name registrations in the gTLDs (including multilingual domain names in the VeriSign test-bed) peaked in October 2001 at approximately 30,700,000 registrations, and has recently decreased to just under 30 million, despite the introduction of new gTLDs.[66] The slight decrease in total registrations, while not encompassing registration activity in the ccTLDs, is considered to be caused by a drop-off in the rate of new registrations, a smaller number of renewals and fewer defensive registrations.[67] The initial "boom" period for the domain name industry, which we have witnessed over the last five years, may now be waning.

With respect to the restructuring that has taken place in the market for gTLDs – that is, introducing compe-

tition among domain name registrars – there have been significant results. VeriSign/NSI's share of total domain name registrations in the gTLDs decreased from approximately 70 per cent of the market as of July 2000 to 50 per cent in January 2001 (chart 5), and further recent falls have also been noted.[68]

In contrast, other ICANN-accredited registrars have gained a greater foothold in the market. For example, Register.com's share increased over the same period, with an approximate share of 15 per cent in January 2001.

Regarding the prices charged by registrars to their customers, there are significant differences. The accredited registrars have implemented various business models in relation to their domain name registration activities. Some registrars concentrate only on domain registration or parking services, while others focus on marketing a more complete service, including hosting. Hosting the domain name can include, for example,

Chart 5
Share of total domain name registrations
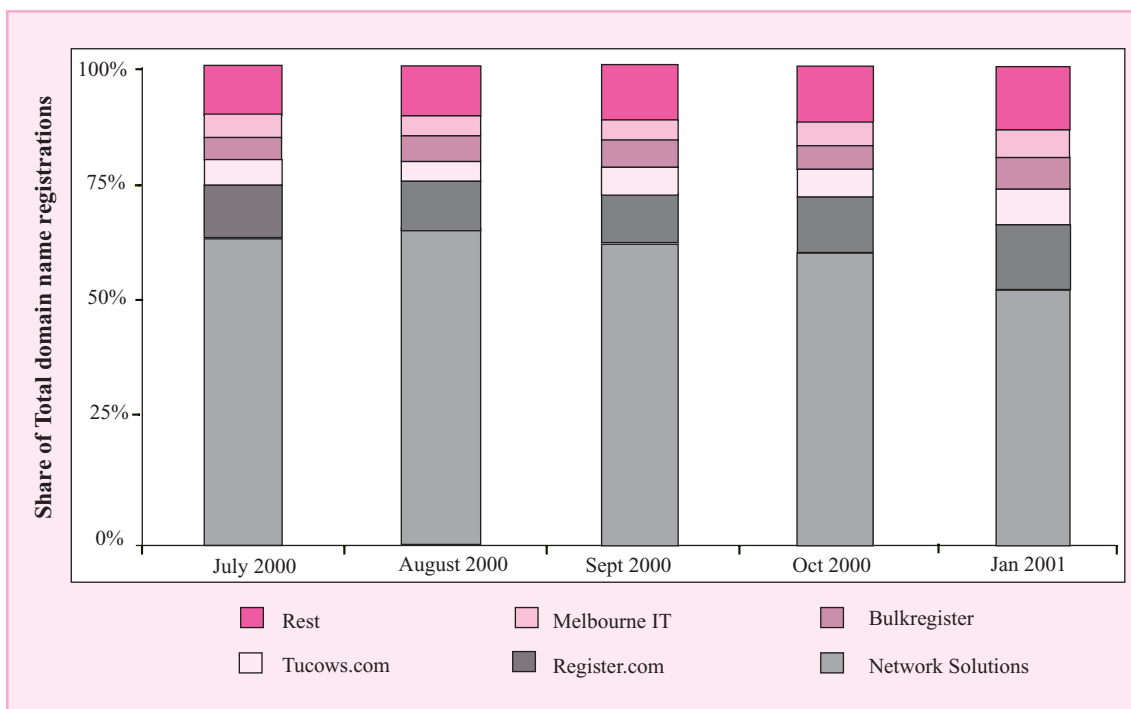
Source: copyright: Matthew Zook (2001).

also providing data storage space for a web presence or e-mail services. These registrars might not charge the user for the registration of the domain alone because they are charging instead for an overall service. There is also no shortage of "free" domain hosting services which usually require the user to include advertising on its website. Finally, some registrars offer

periodic discounts, others offer volume discounts, and still others offer their registration services only to wholesalers.

With these variations in mind, the prices for registration of a domain name in the gTLDs may start at as low as $9 per year, which is similar to the amount that

accredited registrars must pay to VeriSign for each domain name registered in the .com, .net or .org TLDs. Most, however, can be found to charge between $15 and $35.[69] In the ccTLD context, the fees for registration similarly reflect a range of prices. At one end of the spectrum, as in the case of the .cg ccTLD for Congo, registration of a domain name may be free of charge to citizens or lawful residents; at the other end, there are countries where registration can be relatively expensive, such as Togo, where a two-year registration costs $270.

Table 11

Registrar charges, selected registration services in the .com domain (15 June 2002)

Registrar	$ Country	domain/year
NSI/VeriSign	US	35
Register.com	US	35*
TUCOWS.com	CA	10**
BULKREGISTRER. com	US	10***
Melbourne IT	AU	35***
Go Daddy	US	9***

Service includes e-mail address and three web pages.$
** Whole registration service.
*** Members only, one time registration fee $79.*
Source: Icann.

While the domain name registration process appears to be increasingly competitive, there are other areas, such as registry services, where competition is now being introduced, but only in the form of new gTLD registries as alternatives to the .com, .net and .org gTLDs operated by VeriSign. As noted above, there may not always be a strict separation of registry and registrar functions, and this too can lead to competition concerns in relation to whether a given registry, which may also act as a registrar for its TLD, will obtain any unfair advantage, particularly when it has agreements with other companies that are also acting as registrars to receive registrations in the same TLD.

Domain names have increased considerably in market value. A whole new industry of intermediaries has emerged to appraise domain names, in some cases using the appraisal to resell the names directly, while in other cases providing the appraisal to a third party.[70] One way may question whether companies that act to merely snapup and resell popular domain names at

Table 12

Registration fees, selected African ccTLD registration services in geographical order from North to South

ccTLD	Country	Appr. $ Domain/year Initial registration fee
.ly	Libyan Ara Jamahiriya	500*
.sn	Senegal	free
.mr	Mauritania	free
.gh	Ghana	50
.ke	Kenya	200
.ug	Uganda	50
.mw	Malawi	140

* Registration of third-level domains available at cheaper rate.
Source: Alridns.org

premium add any value to the industry or to consumers. Aside from some of the legal (e.g. intellectual property) issues that can arise in the context of domain name resales, however, there can be other concerns. For example, registrars, attracted by the high prices that have been paid for certain domain names, may seek to identify high-value names and take them or otherwise exclude them from the first-come-first-served registration process, in order to sell them at a much higher price to interested customers. A well-designed competitive system seems to be the best way to avoid any such activities. The operation and control of the registry is of major importance in this context: any retired or deactivated domain name must be subject to the random and competitive registration process in which all accredited registrars participate on a fair and transparent basis.

Table 13

Highest reported prices for domain names

Business.com	11/99	$7 500,000
AltaVista.com	07/99	$3 250,000
Loans.com	01/00	$3 000,000
Wines.com	09/99	$3 000,000
Autos.com	12/99	$2 200,000
Express.com	12/99	$2 000,000
WallStreet.com	04/99	$1 030,000
eFlowers.com	02/99	$1 000,000
Forsalebyowner.com	01/00	$835,000
Drugs.com	08/99	$823,456
Cinema.com	02/00	$700,000

Source: domainstuffetc.com

C.   The role of ICANN

Frequent reference has been made throughout this chapter to ICANN, the Internet Corporation for Assigned Names and Numbers. ICANN has become a central player in the management of the DNS, with its governance and coordinating functions extending to many areas of importance for the global Internet infrastructure. However, while it has taken a number of important measures and achieved a number of important successes, it has not been able to avoid continuing questions concerning its structure, basis for legitimacy and authority, funding and international representativeness.

ICANN was formed in 1998 as a private sector initiative to assume responsibility for overseeing the technical coordination of the DNS. There was a sense at that time that the growing international and commercial importance of the Internet necessitated the creation of a technical management and policy development body that was more formalized in structure, more transparent and accountable, and more reflective of the diversity of the world's Internet communities; this contrasted with the early ad hoc and voluntary efforts to coordinate the functions of the DNS. Rather than establish an international treaty-based organization, which might have been the means used in the past to create an entity with oversight of a global medium, a new model was followed. Internet management has generally been based on the principles of non-interference, self-management and self-regulation. In keeping with this trend, ICANN was set up as a non-profit, private sector corporation[71] formed by a coalition of the Internet's technical, business, academic and user communities. ICANN has achieved recognition and received regular input from a number of governments, including those serving on the ICANN Government Advisory Committee (GAC).[72] Nevertheless, it continues to face calls for reform, which consistently raise fundamental questions as to its legitimacy, representativeness, the scope of its authority and appropriate processes for formulating policy.

ICANN states that it has the "objective to operate as an open, transparent, and consensus-based body that is broadly representative of the diverse stakeholder communities of the global Internet".[73] In a phased process with assistance from the United States Government, which funded much of the early development of the DNS, ICANN has been assuming responsibility for coordinating the stable operation of the Internet in four key areas:

- The Domain Name System (DNS);

- The allocation of IP address space;

- The management of the root server system; and

- The coordination of protocol number assignment.

As discussed above, ICANN has been funded through the registries and registrars participating in the global DNS. While maintaining a small staff and a volunteer Board of Directors,[74] ICANN has worked to achieve consensus for its policies through a representative structure composed of three supporting organizations – the Domain Name (DNSO), Address (ASO) and Protocol Supporting Organizations (PSO). Each of these organizations has its own membership and, collectively, they are intended to represent the interests of a broad cross-section of the global Internet's business, technical, academic, non-commercial and user communities. Among ICANN's achievements since 1998, it has developed and launched the system of competitive registrars, implemented a Uniform Dispute Resolution Policy (UDRP) to deal with domain name disputes (discussed below) and introduced seven new gTLDs. On the technical side, ICANN has performed the IANA address allocation and protocol numbering functions and taken over the operation of one of the DNS root name servers.

Despite this progress over the last four years, the critical questioning concerning ICANN's proper role and organization surfaced again earlier this year. The work of the three supporting organizations, and particularly the DNSO, has not proceeded smoothly, but has been accompanied by a constant set of challenges. On 24 February 2002, the President of ICANN, Dr. Stuart Lynn, posted a report entitled "ICANN – The Case for Reform". This was followed by another one, published on 10 March 2002 and entitled "Toward a Statement of the ICANN Mission". In his report, Dr. Lynn emphasized that ICANN, despite its progress, still faces serious issues:

"ICANN is still not fully organized, and it is certainly not yet capable of shouldering the entire responsibility of global DNS management and coordination. ICANN has also not shown that it can be effective, nimble, and quick to react to problems. ICANN is overburdened with process, and at the same time underfunded and understaffed. For these and other more fundamental reasons, ICANN in its current form has not become the effective steward of the global Internet's naming and address allocation systems

as conceived by its founders. Perhaps even more importantly, the passage of time has not increased the confidence that it can meet its original expectations and hopes".

The report grouped ICANN's major problems into three categories: too little participation by critical stakeholders (across the full range of infrastructure operators, major users and national Governments); too much focus on process; and too little funding to support quality services.

Among particular concerns, and an issue that has special relevance for developing countries, the report noted that most administrators of ccTLDs have yet to sign any formalized agreement with ICANN, such as the Model ccTLD Sponsorship Agreement discussed above, which would define the rights and responsibilities of each party. To date, only two countries – Japan and Australia – have signed these sponsorship agreements.[75] Most other ccTLD administrators have cooperated with ICANN policies only on a voluntary and informal basis. The ccTLD constituency group within ICANN has advanced its own model contract for ICANN's consideration, to which ICANN has not agreed. Reflecting ongoing tensions in this area, the ccTLDs, as a group, have further contended that they should have standing to form their own ICANN supporting organization, to be considered on an equal footing with the DNSO, ASO and PSO – as opposed to the current situation in which ccTLDs are only one constituency within the DNSO.

In June 2001 at ICANN's meeting in Stockholm, the ccTLDs voted unanimously to withdraw from the DNSO and to form a new supporting organization, the "ccSO".[76] Discussions continue within ICANN concerning the proper recognition, role and level of participation of ccTLDs within ICANN. The circumstances involving ccTLDs within ICANN, including contribution to ICANN's funding, are clearly among the issues that must be considered in any ICANN reform effort. ICANN must properly address the role of ccTLDs, and make further outreach efforts while at the same time respecting the ccTLDs independence. ICANN must continue to find measures that will secure their voluntary participation in the ICANN system.

Dr. Lynn's report indicated that structural reform, not mere tinkering, was needed to overcome the problems he identified:

"I have concluded that ICANN needs reform: deep, meaningful, structural reform, based on a clearheaded understanding of the successes and failures of the last three years. If ICANN is to succeed, this reform must replace ICANN's unstable institutional foundations with an effective public-private partnership, rooted in the private sector but with the active backing and participation of national governments."

He also recommended a more professional, more broadly representative and more expert Board of Directors, which must be given explicit responsibility for managing the policy development process, and must seek to work more closely with Governments in doing so. He suggested new procedures for nominating Board members. At the same time, he stressed that ICANN should remain an organization that seeks to identify and implement consensus solutions, while being led by the private sector, not Governments.

Following the President's report, the ICANN Board established a Committee on ICANN Evolution and Reform. This Committee has instituted a consultation process, calling for comments on a number of key issues, including:

- What should ICANN's mission be?

- Are the issues raised in the report a correct perception of the problems facing ICANN?

- Assuming that structural and procedural reforms are necessary in order to ensure that ICANN carries out its mission, what transition mechanisms or approaches should be used to migrate from the status quo to the future environment?[77]

Particular topics to be considered by the Reform Committee include:

- ICANN's at-large membership and participation;

- The appropriate means and level of participation by Governments;

- Funding levels and mechanisms;

- Proper ICANN policy-formulation bodies (i.e. the proper constitution and role of supporting organizations and other advisory committees);

- A nominating committee for the Board.

Recently, the former chairperson of the ICANN Board of Directors, Esther Dyson, acknowledged that ICANN is "mired in disputes about authority, accountability and openness". She has suggested that "the US Commerce Department should step in to establish standards to adjudicate disputes if ICANN is unable to solve matters in the next six months".[78] A number of civic groups, led by the Media Access Project, are even calling for the United States Government to reconsider its 1998 selection of ICANN as a private, non-profit organization to take over responsibilities for the DNS. Meanwhile, a Senate committee held hearings in June, and the investigative arm of the Congress has questioned ICANN's legitimacy and effectiveness.[79]

As of the date of this Report, the ICANN reform process continues. At its meeting in Bucharest in June 2002, the ICANN Board approved a "Blueprint for Reform" which recommends a new management structure and procedural change for ICANN.[80] The Board requested that the ICANN Evolution and Reform Committee (ERC) oversee the detailed implementation of the Blueprint. Among the priorities listed was to "devise and incorporate specific measures to ensure, to the extent feasible, geographic and cultural diversity in all parts of ICANN structure".

The ERC has moved forward very quickly with its work on reform. A number of status reports on all aspects – including ICANN's mission and core values, structure, accountability and funding – have been put forward.[81] The ERC will make available its final recommendations in October 2002, to be considered by the ICANN Board at its meeting in Shanghai on October 27-31, 2002.

For developing countries, the reform of ICANN is an important issue, one which should be closely followed. ICANN remains a key institution for coordinating the technical management of the DNS, and a forum where developing countries can become more involved and learn more about the DNS. However, the important questions of reform must be carefully addressed, so that ICANN can build a new mandate and refocus its efforts. Although not a treaty-based organization, ICANN seeks to serve a similar role, managing the DNS as a public good for all. Developing country representatives, acting at a governmental level and at the level of the ccTLD manager, can provide important input on issues involving ICANN's mission, participation of stakeholders and methods for formulating policy. Importantly, developing countries can contribute their views on what mechanisms might best serve to promote international participation and a more international outlook for ICANN.

ICANN, although short of funds, has made outreach efforts towards developing countries. For example, it has held a number of its public meetings during its four years of existence in developing countries, including Chile, Egypt, Ghana and Uruguay. Meetings in 2002 are due to take place in Romania and China. ICANN, however, has not had the resources to be able to operate in more than one language (i.e. English), nor has it established any working groups specifically responsible for promoting and expanding a general understanding of the DNS and ICANN's activities in developing countries. New initiatives by developing countries could promote changes in these and other important areas. At the same time, it is clear that there is presently insufficient funding for ICANN to financially assist in the participation of delegates from developing countries.

As this discussion demonstrates, ICANN and its mandate continue to evolve. Developing countries, either directly or acting through the regional ccTLD organizations described above, should engage in the ICANN process so that their perspectives, requirements and diversity are taken into account.

D. Domain names and legal issues: The relationship between the DNS and intellectual property rights

Domain names have generated a number of legal issues, aside from the contractual arrangements discussed above which establish a chain of agreements defining rights and responsibilities among the DNS players. Foremost among such other issues is the tension arising from conflict between domain names and the existing legal system for protecting trademark rights. The registration and the use of trademarks, which create an exclusive legal right for an owner to use a mark, have fostered confidence in national and international markets by allowing marks to be uniquely associated with a particular company or brand, and by protecting both the public and the mark owner from fraud and deception. Relying on trademark law, a company can develop goodwill in its brand and expect that it will be protected from infringing imitators. At the same time, consumers can gain confidence in particular companies or brands and be protected from the same deceptive practices. Trademarks are important in both developed and developing countries.

Domain names, as we now understand, were launched into the commercial space in a manner that disregarded the existing intellectual property system. A simple, quick and largely automatic process for registering a domain name through a website, first utilized for the gTLDs .com, .net and .org but now commonly applied in many gTLDs and ccTLDs, created conditions for a wave of registrations of popular names. And the domain name registrars – the companies actually registering the names – had every incentive to allow these registrations to continue, thus creating a veritable money machine for their businesses. One positive consequence of this highly automated approach to domain name registrations is that it has presented a low entry barrier for the many new entrants to the e-commerce marketplace, including businesses in developing countries, as they could cheaply and easily register a distinctive name corresponding to their business or brand name. At the same time, however, a group of self-styled "entrepreneurs" have registered thousands of names through automated websites, including generic words as well as names corresponding to trademarks, in order to sell the registration to third parties at a profit. Where a trademark is involved, this has become known as the practice of **cybersquatting**.

Unlike the quick and automated approach for registering domain names, the intellectual property system is administered by public authorities on a territorial basis, creating rights within the territory concerned, in particular for trademarks in relation to certain categories of goods or services. Obtaining a national trademark from the relevant public authority remains a slow and more costly process. The complete disjunction between these two systems has thus given rise to practices that include the deliberate, bad faith registration of trademarks as domain names in order to sell the domain names to the owners of those marks, or simply to take unfair advantage of the reputation attached to the marks.

The incentives for this type of practice existed in particular early on because:

(a) The domain name registration system is based on a simple first-come-first-served practice;

(b) There were no rules in the system that would prevent the "resale" of the names at any price; and

(c) There were no clear legal precedents indicating that the targeting of trademarks through registration of a domain name was an unlawful practice.

All of this, of course, has changed dramatically, although not without passing through a somewhat painful transition in which trademark owners and domain name registrants, and various other stakeholders involved in the Internet, have battled to draw the lines that should apply to delimit fair as opposed to abusive practice.

While the earliest legal precedents establishing fair versus abusive practice were decided in the courts, a significant contribution was made in a study carried out by the World Intellectual Property Organization (WIPO), based in Geneva, entitled "The Management of Internet Names and Addresses: Intellectual Property Issues".[82] WIPO was requested by its member States in July 1998 to study the intellectual property issues associated with domain names and develop relevant recommendations. This study, also known as The Report of the WIPO Internet Domain Name Process ("WIPO Report"), was published in April 1999 after an international consultation process. It proposed a number of recommendations to ICANN on methods for dealing with these and other intellectual property issues arising out of the registration of domain names. The recommendations included:

- **Best practices:** the adoption of improved, standard practices for registrars, in particular in relation to enhanced registration agreements with domain name holders and requiring that they supply accurate contact details. Where it is shown that contact details are inaccurate and do not enable contact with a domain name holder, the registrar should have the right to cancel the domain name registration. This recommendation was implemented through the accreditation requirements established for registrars by ICANN. One of the other legal issues – aside from intellectual property – that arises as a result of the availability of contact details for domain name registrants is concern for protection of privacy, which is discussed below.

- **Exclusions for famous and well-known marks:** it was recommended that, because famous and well-known marks have been a special target of cybersquatters, a mechanism could be introduced whereby the owner of such a mark can obtain an exclusion in some or all gTLDs, prohibiting anyone other than such owner from registering it as a domain name.

This recommendation was never taken up by ICANN.

- **Controlled introduction of new gTLDs:** it was recommended that any new gTLDs should be introduced cautiously and slowly, permitting assessment from the perspectives of stability of the Internet and the intellectual property community. In fact, ICANN has implemented seven new gTLDs, as described above. It has sought to implement a careful and robust process for the implementation of these new TLDs. Nonetheless, their implementation has been accompanied by problems.

- **Administrative dispute resolution procedure:** it was recommended that a mandatory dispute-resolution policy be adopted under which registrants in all gTLDs submit to a uniform administrative procedure for trademark disputes arising out of the registration of their domain names. Following on from this recommendation, ICANN adopted the Uniform Domain Name Dispute Resolution Policy (UDRP), which is discussed at length below.

Of these four WIPO recommendations, the proposal for a new and international dispute resolution policy – the UDRP – has had the greatest significance in the DNS. Before discussing the UDRP, however, it will be useful to review four primary methods by which disputes involving domain names can be resolved: (a) negotiation between parties; (b) mediation; (c) arbitration or similar administrative procedures; and (d) litigation.

There are many circumstances in which, although a claimant might have a strong legal position, it would nevertheless be more practical to buy the name from the registrant at an agreed price. For example, so long as the cost of purchasing the name is cheaper than the alternative means of seeking to obtain the name, practical negotiation might be preferred. This approach can also be less risky than awaiting an uncertain adjudicated decision, and may be a first step before such other measures are contemplated. Mediation, on the other hand, has not generally been perceived as a suitable solution for domain name disputes, particularly when the registration is considered to be abusive. It can, however, be useful to parties disputing in good faith who are unable to come to an agreement among themselves, but are nevertheless willing to negotiate with the assistance of an independent neutral – i.e. the mediator – to find a mutually acceptable solution.

Nominet UK, the operator and registry for the .uk ccTLD, provides informal mediation services for domain name disputes as a preliminary step before escalating the dispute to Nominet's own adjudicated dispute resolution procedure, the Nominet Dispute Resolution Service, which is modelled on the UDRP.

Procedures modelled on arbitration are proving to be perhaps the most effective way of resolving domain name disputes. As noted below, the UDRP follows an arbitration model of semi-private adjudication, although the decisions in these cases are publicly posted. For many individuals and entities, this arbitration model is a feasible and cost-effective method for resolving disputes in a short period. This may be particularly true for businesses and individuals from developing countries. Litigation, in contrast, is generally considered to be the most expensive and lengthy process for resolving a domain name dispute. This is due to court procedural requirements and deadlines, and the likely need to hire local counsel, as well as possible congestion in certain court systems. These factors can combine so that a dispute will drag on for many months at significant cost to the parties involved. High costs can be a disadvantage to businesses and individuals in developing countries. The cost of dispute resolution procedures becomes a key element, among several others, in evaluating the fairness of an international system for resolving domain name disputes.

Finally, it should be noted that various mechanisms have been established to avoid disputes before they arise, such as limited pre-screening prior to registration, or "sunrise" periods during which only trademark owners can register – for example, Afilias established a sunrise period for the .info TLD.[83] Although a laudable objective for avoiding disputes, these efforts have themselves generated further issues and consequences.[84]

1.   Uniform Domain Name Dispute Resolution Policy (UDRP)

The UDRP was adopted by ICANN and went into effect on 1 December 1999, applying to domain name registration in the gTLDs. Modelled on recommendations made by WIPO, it provides trademark holders with an administrative mechanism for the resolution of disputes arising out of the bad-faith registration and use by third parties of Internet domain names corresponding to their trademarks.

When it was introduced there was some uncertainty as to whether the new UDRP procedure would be widely used by trademark holders to assert their rights. In particular, during the consultations of the WIPO Domain Name Process, some comments were received from groups at both ends of the debate spectrum – that is, representatives of trademark holders as well as Internet groups asserting the rights of domain name holders – to the effect that the creation of a new international forum for resolving such disputes might not gain the trust of these parties and would therefore not be extensively used. However, on 2 December 1999, the first day after the UDRP was adopted, the answer to this uncertainty gradually started to become clear. The WIPO Arbitration and Mediation Center received the first domain name complaint filed under the UDRP, and some six weeks later, a panellist appointed by the WIPO Center decided that the domain name at issue, http://worldwrestlingfederation.com, was to be transferred to the complainant, the World Wrestling Federation Entertainment, Inc.[85] For parties from developing countries, the UDRP offers an internationally accessible dispute resolution forum, but as with any legal procedure, parties must be well informed about their rights as well as about the requirements of the procedure itself.

Since the commencement of the UDRP approximately two and a half years ago, more than 6,100 cases have been filed under the procedure. This is a significant number of disputes to be submitted in a short time to a new forum applying new procedures. While most commentators have expressed positive views concerning the UDRP, there have been issues raised by some, which are discussed below, about the overall fairness of the procedure, particularly as regards domain name registrants.

(a) Review of the UDRP procedure

ICANN introduced the UDRP and an accompanying set of procedural Rules,[86] and further determined that multiple dispute-resolution service providers, which ICANN would periodically accredit, would administer the uniform procedures. As a result, trademark holders can submit complaints to the following dispute-resolution providers for disputes involving domain names that have been registered by an ICANN-accredited registrar:

- Asian Domain Name Dispute Resolution Centre (ADNDRC), approved effective 28 February 2002, with offices, in Beijing and Hong Kong (China);[87]

- CPR Institute for Dispute Resolution (CPR), approved effective 22 May 2000,[88] located in New York;

- eResolution (eRes), approved effective 1 January 2000; no longer accepting proceedings commenced after 30 November 2001 and now out of business;

- National Arbitration Forum (NAF), approved effective 23 December 1999,[89] located in Minneapolis;

- World Intellectual Property Organization (WIPO), approved effective 1 December 1999[90], with its office in Geneva.

As indicated above, the ADNDRC is the provider most recently approved by ICANN, and it will offer enhanced accessibility to the Asia-Pacific community.

The UDRP procedure is a uniform procedure, which means that the same rules for decisions and procedures are to apply no matter which of the dispute resolution providers handles a complaint. This uniformity also works to enhance a general understanding of the UDRP, which can be of benefit to all parties wherever they are located, be it in developed or developing countries. The procedure is optional for trademark owners: they may choose to use the UDRP or they may go to court. Domain name registrants, by contrast, must agree in their registration agreement to submit to the UDRP procedure, once a complaint has been filed concerning a domain name registered by them. The UDRP is limited to cases of bad-faith registration and use. Cases between parties alleging competing legitimate rights to names are therefore excluded.

For a complaint to be successful under the UDRP, the complainant must establish that the following three cumulative criteria are satisfied:

- (a) The domain name is identical or confusingly similar to a trademark or service mark in which the complainant has rights;

- (b) The registrant of the domain name has no rights or legitimate interests in respect of the domain name; and

- (c) The domain name has been registered and is being used in bad faith.[91]

The complainant must demonstrate and prove that all three of the above elements are present.[92] Further

guidance as to what constitutes evidence in bad faith registration and use of the domain name[93] is provided in the UDRP. These illustrative circumstances include the following:

(a) The registrant has acquired the domain name primarily for the purpose of selling, renting or otherwise transferring it to the complainant who is the owner of the trademark or service mark, or to a competitor of the complainant, for valuable consideration in excess of the "out-of-pocket" costs directly related to the domain name;

(b) The registrant has registered the domain name in order to prevent the owner of the trademark or service mark from reflecting the mark in a corresponding domain name, provided that a pattern of such conduct is evidenced;

(c) The domain name has been registered primarily for the purpose of disrupting the business of a competitor; or

(d) The domain name has been registered primarily for commercial gain through creating the likelihood of confusion.

In defence of its registration, a domain name holder – referred to as the respondent under the procedure – can demonstrate its rights or a legitimate interest in a domain name by presenting evidence that:

(a) Before any notice to the respondent of the dispute, the respondent used, or prepared to use, the domain name or the name corresponding to the domain name in connection with a bona fide offering of goods or services;

(b) The respondent has been commonly known by the domain name, even if the trademark or service mark rights have been acquired; or

(c) Legitimate non-commercial or fair use of the domain name, without intent to divert consumers or tarnish the trademark or service mark for commercial gain, is being made.[94]

A respondent can further allege "reverse domain name hijacking" that is, that the complaint was brought in bad faith, i.e. primarily to harass the domain name holder. If the panel agrees, it may declare in its decision that the complaint was brought in bad faith and constitutes an abuse of the administrative proceeding.

To begin a case under the UDRP, the complainant must submit a complaint to one of the

ICANN-approved dispute resolution service providers. Model forms for the complaint (and response) are available from each service provider through its website. The complainant must specify whether the dispute is to be decided by a single- or three-member panel. If the complainant requests a single-member panel, the respondent has the right to indicate in its response that it would choose to have the dispute decided by a three-member panel instead.[95] The fee for a single-member panel is paid entirely by the complainant – this is an important cost factor built into the design of the UDRP.[96] However, if the complainant has elected to have the dispute decided by a single-member panel and the respondent requests a three-member panel, the respondent is then required to pay half of the applicable fee for the three-member panel.[97]

Once the service provider has received the complaint and confirms that it complies with the requirements of the UDRP and the service provider's supplemental rules, it is then forwarded to the respondent.[98] The respondent must provide a response to the complaint within 20 days.[99] If the respondent fails to respond, the panel will decide the case on a "default" basis, reviewing only the information and evidence furnished by the complainant.[100] Following receipt of the response (or after the 20 day period has elapsed), a decision should be issued by the panellist two weeks later, unless there are exceptional circumstances.

The UDRP procedure is relatively simple because the remedies available are restricted to:

• Transferring the domain name registration;

• Cancelling the domain name registration; or

• Rejecting the complainant's claim, in which case the domain name registration remains with the respondent.

Monetary damages in particular are excluded under the UDRP, as is the award of any costs associated with the procedure.[101]

Once a UDRP decision is notified by the dispute resolution service provider to the registrar that handled the registration of the domain name in dispute, that registrar is obliged to implement the decision. This required enforcement, for example to transfer the domain name registration from the respondent to the

complainant, will take place ten days after the panel decision has been notified, unless the respondent files a court case against the complainant within that period and provides a copy of the court complaint to the registrar. By assuming the key role under the UDRP of implementing decisions notified to them, registrars reap a significant benefit: they avoid being joined directly as parties in the dispute itself. Questions of direct or indirect infringement are no longer of serious concern to registrars, so long as they carry out their responsibilities within the ICANN system and, in particular, under the UDRP. The direct enforcement of UDRP decisions by registrars also lightens the burden on parties located internationally to obtain the intended result under the procedure without needing to go to court merely to enforce a UDRP decision.

(b) Responsibilities of UDRP dispute resolution service providers

One of the significant challenges faced by the dispute resolution service providers implementing the UDRP has been not only to achieve acceptance of this novel administrative procedure, but also to encourage parties to use the procedure in an online manner. Given the nature of the disputes (i.e. who has rights to a particular domain name that is to be used as an Internet address), it is reasonable to assume that parties will have some technical sophistication and access to technology. At the same time, however, consideration must be given to the likely international spread of the parties using the UDRP system, many of whom might speak different languages and operate in different business and legal cultures, and some of whom would face significant technical bandwidth constraints. These are real concerns which test the effectiveness of the procedure, particularly for parties located in developing countries.

The service providers addressing these challenges have had to adopt approaches that are appropriate for the broadest possible constituency – some have done a better job than others. Since the process takes place online, the dispute resolution provider's website itself should be extremely reliable, meeting the requirements of an audience that requires international access and service. In addition not only the UDRP procedures but also the dispute resolution providers' administrative services should be broadly transparent. Thus, a provider's website should present the procedure as largely self-explanatory by providing complete information, including the source documents, guides, model forms, notices of pending cases and full texts of published decisions. The accredited dispute resolution providers have so far done a good job of meeting these aims. Furthermore, the website, if at all possible, should provide this information in a multilingual presentation to meet the needs of parties around the world – the ADNDRC and WIPO for example, provide services and information in languages other than English. Finally, with respect to technology, the provider's systems should use only commonly available tools, such as a website accessible using the common browsers, e-mail with attachments in multiple formats, and support and answers to questions by telephone, when necessary.

(c) Analysis of the UDRP

It is remarkable that the international forum established by the UDRP, and the online dispute resolution services offered thereunder, both of whose viability was questioned early on, have met with widespread and international acceptance. Complainants entrusting their cases to the UDRP now include internationally recognized businesses from every sector of commerce. Moreover, many smaller enterprises and individuals from different countries have also used the UDRP. Reflecting the international reach of electronic commerce, the parties filing or defending cases have come from more than 70 countries on every continent. Under the ICANN Rules, procedures have been conducted mostly in English, but also in Spanish, French, German and Japanese, with other languages to follow.

The use of electronic communications has allowed parties to participate according to their own schedule, rather than concern themselves with rushing a paper submission to the court-house steps. The automatic enforcement of decisions by accredited domain name registrars, once the required 10 day period has passed, avoids the need to seek enforcement of UDRP determinations in national courts. These measures, combined with the uniform set of procedural rules providing the framework under the UDRP, enable the dispute resolution service providers to administer cases from beginning to completion – on average, within two months of the filing of the complaint. The decisions are posted on the Internet by ICANN and the dispute resolution providers. The success of the UDRP so far owes much to the efficiency of these procedures and to the direct enforcement of the resulting decisions.

The international procedure also avoids the need to hire local counsel and to understand the local court rules and procedures (often a necessity in international

litigation). The UDRP itself lays down the three criteria for decision, and allows panellists in particular cases to make reference to any rules or principles of law that may be deemed relevant. A party can choose to represent itself, or to be represented by a lawyer who is able to carry the case from its commencement to decision. Travel is not required in order to prosecute a case: the procedure envisages that physical in-person hearings will be held only in the case of an exceptional matter, and so far it appears that no hearings have been held for any of the cases filed.

The relative simplicity of the system also extends to the schedule of fees. As noted above, the costs of the procedure are borne by the complainants (unless the respondent requests a three-member panel), who pay a fixed amount that covers both the dispute resolution providers' services and the remuneration of the administrative panel. This element is important, and takes into account the fact that domain name registrants might not be in a position to cover substantial expenses associated with the procedure. The actual level of the fee depends on the number of domain names joined in a single dispute and on whether the case is to be decided by a single-member or three-member panel. The procedure appears to result in significant gains in efficiency while enabling a reduction in costs.

Perhaps in the light of this increased efficiency, one may ask whether the UDRP accords with accepted notions of due process for all the parties concerned. This is obviously an important question, and one that has been the subject of debate, particularly in the light of certain well-publicized decisions, among those following developments for this new administrative forum. Complainants have prevailed in approximately 80 per cent of the decided cases, securing the transfer of the domain name(s) in question.[102] This high rate of decisions favourable to the complainants has also raised questions among commentatoors.[103] A number of commentators have voiced concerns about the UDRP, which are summarized in box 3.

Box 3

Critique of UDRP

- The system is said to promote forum shopping by complainants among the accredited dispute resolution service providers.[104]

- Respondents are given insufficient time to respond (i.e. the 20-day period for filing a response).

- Panel composition (i.e. a one- or three-member panel) is a factor influencing case outcomes. Single-panel cases constitute approximately 90 per cent of the total caseload, while three-member panels comprise the remaining 10 per cent. Complainants win approximately 80 per cent of the time where a single panellist is appointed, compared with 60 per cent when a three-member panel is responsible for the decision.

- There is a lack of transparency regarding appointment of panellists in single-member cases.

- The decisions themselves are inconsistent and sometimes poorly reasoned.

- There is an absence of quality control mechanisms – i.e. appeal – built into the system.

These concerns have elicited thoughtful responses in the ongoing discussions concerning the UDRP. A significant study by the Max Planck Institute addressed a number of these concerns, including that the system "might be misused by rightholders, in particular big companies, in order to obstruct the selection and use of domain names by small business and private parties".[105] The Max Planck study found that:

"as a matter of principle, the UDRP is functioning satisfactorily. No major flaws have been identified in the course of the evaluation".[106]

At the same time, the study confirmed that "considerable differences exist with respect to the outcome of decisions handed down" by one of the providers, eResolution, as compared with the National Arbitration Forum and the WIPO Arbitration and Mediation Center. Another commentator has explained that this difference could be due to the larger number cases in which three-member panels have acted to issue decisions administered by eResolution.[107] One would normally expect these cases to be more highly contested and not the outcome of non-contested default proceedings.

The Max Planck study identified four areas in which application of the UDRP was unclear and where further consideration could be given:

- The conditions under which a domain name is found to be "confusingly similar" with a trademark;

- Measures to be taken in order to safeguard the interests of free speech;

- Rules concerning the burden of proof and the standards to be applied in the assessment of the parties' contentions; and

- The possibility of an appeal against UDRP decisions and how this could be incorporated in the UDRP framework.

Forum selection: With respect to the issue of forum selection raised above, it is clear that most complainants choose to submit their claims to the WIPO Center. A number of factors, other than the "win" percentage, can be important in explaining this choice. WIPO was the first accredited provider in the UDRP system, and provides an useful presentation of information on its website. Until recently, WIPO was the only dispute resolution service provider outside North America, and it offered its services and administered its cases in a number of different languages. It was responsible for the First Domain Name Report, which led to the adoption of the UDRP, and this factor too could be influential as regards the trust that has been placed in WIPO, not to mention the fact that it is a United Nations specialized agency. Its member States have been fully supportive of its role in administering domain name cases.

At the same time, the UDRP was indeed designed to give the complainant the choice of provider when submitting a claim. One might ask whether this was a wise policy, but it is not too dissimilar to other dispute resolution contexts, in which the plaintiff chooses the forum in which it will seek to prosecute its case. One commentator recently addressed these issues as follows:

"The UDRP procedure is far from perfect, but it is not unfair. No fair minded person could honestly believe that a provider would risk its reputation by selecting panellists who would decide cases in a predetermined way. No panellist could hope to uphold her reputation, if she were to find for one party regardless of the law or the facts. Indeed, such conduct would be so transparent that users would lose

all confidence in the process. Clearly, this has not happened."[108]

High rate of success among complainants: With regard to complainants' high rate of success, it should be considered that UDRP cases are submitted by complainants to any of the providers on the basis of an assessment of whether the complainant believes it has a good chance of success. There is a key element of 'self-selection' at the outset, which should also be viewed as responsible, at least in part, for the rate of success among complainants in general. The factual dispute centring on whether a domain name registration should be considered abusive presents a relatively uncomplicated set of circumstances, compared with the multidimensional factual disputes that can arise in other contexts of commercial litigation or arbitration. The UDRP itself excludes any consideration of monetary damages. Furthermore, the UDRP sets out bright line criteria for decisions about which factual circumstances will be considered an abusive registration, which prospective complainants can review before deciding whether to file a case. This greatly simplifies the situation, and also accounts for the fact that so many of the UDRP cases are uncontested and proceed on a default basis.

Given the clearly stated UDRP criteria for abusive registration, and the growing collection of precedents which are available for review online, a legal adviser can counsel a client against filing a case under the UDRP if the factual basis for cybersquatting is not apparent. As noted above, the adviser may propose, for example, that negotiation to purchase the name is a more realistic approach, and a safer course overall in terms of managing the trademark owner's rights. This self-selection among the cases that are filed is an important element in the analysis of UDRP decisions and the prevailing high rate of success.

Time limit for response: It is also said that the UDRP imposes difficult time limits for respondents to be notified of, and to have time to respond to, a complaint brought against them. Developing countries may be affected by this in that there may be language barriers or difficulty in accessing the Internet to read e-mails and find out about a complaint, or understand the procedure in time. However, the UDRP states that the 20-day period may be extended either in exceptional cases or if parties mutually agree to extension.[109] The appropriate time for allowing the respondent to submit a response must be weighed against the overall time frame of the procedure – which is 45-60 days. Within this context, an additional

5-10 days for the response, given that it is the single submission to be provided by the respondent, may be appropriate.

UDRP appeals: The UDRP does not have an appeals mechanism. Part of the reason for this is to maintain the entire process of resolving domain name disputes as a fast, cost-effective and efficient process, which in turn makes it a more widely accessible system. The cost of filing a claim under the UDRP is currently reasonable on an international basis, even for parties in developing countries. If an appeals system is added in to the system, it may improve the quality of the decisions, but it will also add to the expense for many who might then have almost no other affordable way of filing a legitimate claim (this extra expense, however, might be limited to the appeal level only). Determining the proper constitution of an international appeal panel would also be a very difficult task. At present, given that the UDRP is an administrative procedure – as opposed to a binding arbitration – parties retain the right to take a case to the national court system.

Summary: To put these issues in context, several of the basic features of the UDRP must be re-emphasized. First, the UDRP establishes an international forum in which parties around the world now have equal and improved access to an inexpensive dispute settlement mechanism for resolving their domain name disputes. The scope of the UDRP is narrowly circumscribed to those cases brought by a party that can demonstrate the required three elements:

- That the domain name is identical or confusingly similar to a trademark in which that party has rights;

- That the domain name registrant has no rights or legitimate interests in the domain name; and

- That the domain name has been registered and is being used in bad faith.[110]

Each of these elements, as noted, must be proved by the complainant. The UDRP establishes a specialized set of procedures, tailored to the facts of a domain name dispute, and uses accredited dispute resolution service providers, who in turn draw from their rosters of expert neutrals to select panellists. The development of the facts and records for a case is based on a single submission from each of the parties, unless a panellist chooses to request additional information (and there is no guarantee that a panellist will exercise his or her discretion to do so). Furthermore, the scope of the remedies under the UDRP excludes monetary

damages and relates only to the status of the domain name registration. The complainant is normally required to cover the costs of the administrative procedure, unless the respondent has demanded a three-member panel, in which case the parties will share the extra costs of the panel. Finally, a complainant or domain name registrant is free to go to court either before or after the UDRP proceedings. If court proceedings are initiated within ten days of a UDRP decision, the status of the domain name in question will remain undisturbed (i.e. in the hands of the domain name registrant) until the completion of the court procedures.

Under these circumstances, it can be considered that the administrative system established by the UDRP survives the scrutiny of any due process concerns. The procedures and their implementation are appropriate to the nature of the disputes covered, and the degree of finality accorded to them. The UDRP also marks the first attempt to deal with cybersquatting in a systematic and internationally effective manner. Not surprisingly, therefore, the UDRP has received widespread attention. This is true for the legal and trademark community, and also for the general media.

The area of domain name disputes is but an early example of the emerging types of disputes that will arise as electronic commerce expands internationally. Linked through a series of contracts, all of the relevant players in the domain name system, including the technical company that enables access, have certain responsibilities under the dispute settlement procedure. Once a complainant chooses to join the procedure by submitting a complaint, the mechanics of the system are in place to guide the parties to a quick and fair result that will be automatically enforced. An administrative system such as the UDRP represents a pragmatic solution for disputes in the international marketplace of electronic commerce, avoiding the concerns and uncertainties associated with traditional litigation in national courts. This model can be used for dispute resolution in the ccTLDs, and can be of significant advantage to parties in developing countries.

2. Future legal issues for domain names

Intellectual property issues continue to receive attention in the DNS. The Final Report of the WIPO Internet Domain Name Process acknowledged that its recommendations targeted only the most serious problems caused by the conflict between domain

names and trademarks, and that other issues would require further consultation.[111] In July 2000, WIPO convened the Second WIPO Internet Domain Name Process to address domain name and intellectual property issues where continuing uncertainty remains, including recommendations on the bad faith, abusive, misleading or unfair use of:

- Personal names;

- International non-proprietary names (INNs) for pharmaceutical substances, of which there are more than 8,000;

- Names of international intergovernmental organizations (IGOs);

- Geographical indications, indications of source or geographical terms; and

- Trade names.

The Report of the Second WIPO Process, published in September 2001, found generally that the international legal framework for the protection of these identifiers is not as developed as that for the protection of trademarks. The Second Report was therefore more reserved in recommending international solutions. For example, in certain countries protection exists for geographical indications and trade names, but there is no international system applied in a relatively uniform manner. Moreover, with respect to personal names and the names of geographical localities, no clear protection exists when these terms are used outside commercial channels (and thus fail to qualify independently for trademark protection). The Second Report suggests that the international community still needs to decide whether it wishes to address these insufficiencies, in order to establish a legal basis for dealing with those practices that might be considered unacceptable.

The WIPO Second Report did recommend, however, that a mechanism be established to protect INNs against identical domain name registrations, and also that an administrative dispute-resolution procedure, similar to the UDRP, be established so that an IGO could bring a complaint when a domain name was creating a misleading association between the domain name registrant and the IGO in question. In this respect, it is possible for the Second WIPO Report – which also discusses the prospect of an international treaty –to have a significant impact. Developing countries can have input into these issues, as the Second

Report is still being considered by a committee of WIPO member States.

Finally, the Second WIPO Report also addresses a subject that is increasingly relevant today in view of the recent attention given to Internet privacy issues. It recommends that domain name registration companies in the existing and future gTLDs (e.g. .com, .net and .org as well as the newly approved gTLDs – .aero, .biz, .coop, .info, .museum, .name and .pro) should be required to provide accurate and publicly available WHOIS data about domain name registrants, subject to such users being clearly informed (and giving informed consent) about which data will be collected, the purposes for which it will be collected, and the uses to which it may be put, such as consumer protection, law enforcement and IP protection. Privacy issues inevitably arise when the details of a domain name registrant are sought even for legitimate purposes such as IP enforcement. A responsible approach to these issues, adopted by a ccTLD and made publicly available for inspection, can enhance confidence in national ccTLDs.

E.   Concluding remarks and policy recommendations

The development of a national domain name system (DNS) infrastructure is an important means for enhancing the online exchange within developing countries, thus creating a valuable resource for communication, education and business. At the same time, however, domain names and the DNS give rise to a complex array of commercial, technical, policy and legal questions which typify many of the cross-border issues presented by the Internet and digital commerce. Developing countries need to understand these issues and formulate responses that are appropriate for the country's online community, satisfying relevant legal, cultural, economic, language and other dimensions. They should also promote public awareness and education about the DNS and the opportunities and benefits it offers.

Policy decisions are required in relation to the ccTLDs of developing countries, ones which foster not only a more relevant registration of domain names but also an overall confidence in the ccTLD space. The policies for ccTLDs should be carefully formulated, taking into account appropriate legal, cultural, economic and linguistic requirements. Developing countries' ccTLD administrators should improve domain name registration practices through clear agreements setting out the

rights and obligations of the parties, ensuring fairness to all eligible registrants requesting domain names, and establishing a clear policy for maintaining contact details of registrants, availability to third parties and privacy. Developing country ccTLD managers should become involved in the relevant forums available for exchanging information and participating in DNS policy-making.

It is recommended that developing countries also become involved in the ICANN reform process, as it provides a renewed opportunity to provide input about their perspectives, requirements and diversity, and to promote modalities for ICANN's work that better address the needs of their constituencies. Furthermore, they should consider establishing coopera-tive relationships so as to increase their capacity to deal with and influence the current debate. In doing so, developing countries would take advantage of the work and progress in relation to domain names and intellectual property, including the establishment of dispute avoidance and dispute resolution policies.

Further to ICANN's adoption in 1999 of an interna-tional dispute resolution system, namely the Uniform Domain Name Dispute Resolution Policy (UDRP), it is also recommended that developing countries become more involved in the current UDRP debate and in the discussions about whether protection should be provided in the DNS for categories of iden-tifiers other than trademarks, such as personal names, geographical indications and trade names.

Notes

1 *See E-Commerce and Development Report 2001,* at pp. 107-110.

2 The Anticybersquatting Consumer Protection Act, amending Section 43 of the Trademark Act of 1946, 15 U.S.C. ß1125(d).

3 Complete information about ICANN is available through its website at www.icann.org and further discussion is provided below.

4 The Uniform Domain Name Dispute Resolution Policy is posted on ICANN's website at www.icann.org/udrp/. Further information and analysis concerning the UDRP are provided below.

5 Information concerning domain names and country domains in particular is available at the following websites:

-   Internet Corporation for Assigned Names and Numbers (ICANN): www.icann.org;

-   ICANN ccTLD information: www.icann.org/cctlds/;

-   International Telecommunication Union (ITU) Multilingual Domain Names: www.itu.int/mdns/resources/ index.html*;*

-   World Intellectual Property Organization (WIPO) Domain Names information: http://ecommerce.wipo.int/ domains/index.html;

-   Legal information concerning the Uniform Domain Name Dispute Resolution Policy: www.udrplaw.net/;

-   Activist observer group to ICANN at www.icannwatch.org/.

6 The International Telecommunication Union (ITU) located in Geneva, Switzerland, is an international organization within the United Nations system where Governments and the private sector coordinate global telecom networks and services. See the ITU website at www.itu.int.

7 The United States Government, acting through the Department of Commerce, has provided oversight of Internet and DNS developments, particularly when technical management issues were being dealt with by the Internet Assigned Num-bers Authority (IANA). It has, for several years, been working as discussed below to transfer supervisory functions to ICANN.

8 "Noms de domain" in French and "nombres de dominio" in Spanish.

9 The term has started to appear in some but not all dictionaries. For example, *The American Heritage Dictionary of the English Language* (4th ed., Houghton Mifflin Company) provides the following definition: "A series of alphanumeric strings sepa-

rated by periods, such as *www.hmco.com,* that is an address of a computer network connection and that identifies the owner of the address". The Concise Oxford dictionary (10th ed., Oxford University Press) states that a "domain" is "a distinct subset of the Internet with addresses sharing a common suffix".

10 See the statistics maintained by NetNames International Ltd. at www.domainstats.com.

11 Mueller (2000a).

12 WIPO (1999, para.9).

13 See for example the statistics at www.zooknic.com/Domains/counts.html for the growth *of* com/net/org/edu domain names, and the statistics at www.denic.de/DENICdb/stats/domains_fancy.html for the growth of the German top-level domain ".de".

14 See Howe (1993-2001). For an even more technical definition, see the IANA website (www.iana.org/ipaddress/ ip-addresses.htm) which states that "Internet Protocol (IP) addresses . . are 32-bit numbers often expressed as 4 octets in "dotted decimal" notation (for example, 192.168.45.230)".

15 See note 11.

16 For a detailed publication on the history of the DNS, see Rader (2001).

17 He served as editor of an important series of more than 2,400 Requests for Comments (RFCs) from 7 April 1969 (the date of its inception) until his death in October 1998. RFCs are the definitions of the protocols and policies of the Internet, see Rader (2001).

18 See www.netsol.com. Verisign acquired Network Solutions Inc. (NSI), the operator of the .com, .net and .org gTLDs, in March 2000.

19 See ICANN, *ICP-3, A Unique, Authoritative Root for the DNS,* 9/7/01, at www.icann.org/icp/icp-3.htm.

20 See, for example, General Rules for the United Kingdom's .uk top-level and second-level domains at www.nic.uk/rules/ rup2.html.

21 Of the 12 root servers that draw data directly from the "A" root server, seven currently are owned by the United States Government or operated by its contractors. For a more detailed analysis of who operates the root servers, see l Froomkin (2000).

22 See Diana Cabell, *Learning Cyberlaw in Cyberspace, at* ww.cyberspacelaw.org/cabell/index.html.

23 See InterNIC FAQs at www.internic.net/faqs/authoritative-dns.html*.*

24 Among these new pseudo-TLDs are the *.ltd, .shop, .law, .love* and *.kids* domains, as well as *.web.* See, for example*,* www.new.net and www.web.net.

25 In practice, however, the United States Government reserves the *.gov* and *.mil* gTLDs for its exclusive use. The *.gov* TLD is operated by the United States General Services Administration The *.mil* TLD is reserved exclusively for the United States military and is operated by theUnited States Department of Defense Network Information Center.

26 For example, the *.coop* gTLD opened its registration service on 31 January 2002. *See* www.cooperative.org/news/ latest_news.asp?id=26. The operating entities for the *.pro* and *.aero* gTLDs are still not accepting registrations.

27 See www.iana.org/gtld/gtld.htm.

28 See www.neulevel.com/aboutnl/faqs.html.

29 As discussed below, developing countries may wish to sponsor a new multilingual TLD, particularly as the technology becomes available to make such internationalized TLDs a realistic possibility. See section B.2(c).

30 No new ccTLD will be accepted into the common A-root system unless it appears on this list; see www.iana.org/cctld/ cctld.htm. See also the website of the International Organization for Standardization, which describes how the list is updated regualrly by the ISO Maintenance Agency, at www.iso.org/iso/en/prods-services/iso3166ma/index.html.

31 See W. W. Fisher and S. Mendrey, *Domain Names and Trademarks, at* http://eon.law.harvard.edu/h2o/property/domain/ main.html.

32   See, for example, policies for Italy, Japan and the Republic of Korea; see Fisher and Mendrey.

33   See Nominet's web site at www.nominet.uk. The Nominet.UK rules are listed at www.nominet.org.uk/rules.html.

34   See www.iis.se/regulations.shtml.

35   Difficult questions sometimes arise concerning who should be the proper ccTLD administror, or even whether a particular country code should be delegated. See the website of the Internet Assigned Numbers Authority (IANA), which contains reports on noteworthy delegation and redelegation matters. (www.iana.org/cctld/cctld.htm). See, for example, the report of considerations concerning the delegation of .ps for Palestine, at www.iana.org/reports/ps-report-22mar00.htm.

36   A copy of latest version of this agreement, dated 31 January 2002, is available at http://www.icann.org/cctlds/.

37   See section 1.7 of the Sponsorship Agreement.

38   See Attachment F to the Sponsorship Agreement.

39   See the website for DENIC eG at http://www.denic.de.

40   See Newsbytes, *Singapore plans competition in domain name registration, at* www.newsbytes.com/cgi-bin/udt/i...le?client.id=newsbytes&story.id=172137.

41   See Regulation (EC) No. 733/2002 of the European Parliament and of the Council on the Implementation of the .eu Top Level Domain, 22 April 2002. *Official Journal of the European Communities*, L113/1 (30 April 2002).

42   The e-Europe initiative was endorsed by the European Council at its meeting in Lisbon in March 2000.

43   Regulation (EC) No. 733/2002, at Preamble.

44   Id.

45   See "Best Practice Guidelines for ccTLD Managers", 10 March 2001, at www.icann.org/cctlds/cctldconst-4th-best-practices-10mar01.htm.

46   See the "WIPO ccTLD Best Practices for the Prevention and Resolution of Intellectual Property Disputes", at http://ecommerce.wipo.int/domains/cctlds/bestpractices/bestpractices.html.

47   See the 'WIPO Ecommerce ccTLD Database' at http://ecommerce.wipo.int/databases/cctld/output.html.

48   See African Top Level Domains (AFTLD) Project at www.aftld.org/.

49   See, for example, the ICANN ccTLD web page at www.icann.org/cctlds/.

50   Despite the Internet's origins in the United States, it is currently estimated that by 2003 two thirds of all Internet users will be non-native English speakers. See "WIPO Briefing Paper: Internationalized Domain Names – Intellectual Property Considerations" at http://ecommerce.wipo.int/domains/international/pdf/paper.pdf; see also www.walid.com/en/docs/index.shtml.

51   ASCII is the American Standard Code for Information Interchange, and is the most prevalent format for text files used in computers networks. In an ASCII file, each alphabetical, numerical or special character is represented with a 7-bit binary number (a string of seven 0s or 1s). See Joint ITU/WIPO Symposium on Multilingual Domain Names at www.itu.int/itunews/issue/2002/01/joint.html.

52   As noted in the WIPO Briefing Paper, (see note 50), DNS mapping technology has functioned thus far using only Latin characters that are used to write in a number of languages, including English, French, German, Italian and Spanish.

53   On 20 June 2001, VeriSign (previously Network Solutions), the operator of the .com registry, announced that it would provide full functionality for the registration of internationalized domain names for nearly 80 per cent of the world's Internet users. VeriSign has since introduced an Internationalized Domain Name Testbed, which allows users to register domain names in any script supported by Unicode. In November 2000, a company known as Walid introduced technology enabling the registration of domain names using the Hindi language. With this technology, Hindi speakers will be able to register Internet domain names using Hindi characters, and users will be able to access WorldWide Web content using those Hindi-language domain names. A resource page addressing IDNs, including a list of IDN solution providers, is maintained by the ITU at www.itu.int/mdns/resources/index.html.

54 See www.ietf.org. A working group within the IETF has the objective of specifying the requirements for internationalized access to domain names and formulating a standards track protocol based on those requirements.

55 The Discussion Paper states that "as part of its charter, the ICANN IDN Committee is tasked with anticipating the policy issues that would arise if and when ICANN confronts demonstrably deployable non-ASCII TLDs".

56 See ICANN website for IDN Committee, at www.icann.org/committees/idn/.

57 See ICANN IDN Committee Discussion Paper on Non-ASCII Top-Level Domain Policy Issues at http://www.icann.org/committees/idn/non-ascii-tld-paper.htm.

58 Statistics provided by Walid, Inc. at www.walid.com (November 2001).

59 These registrars are located in many countries, such as Australia, Barbados, France, India, Italy, Japan, Jordan, Kuwait, New Zealand, Norway, Philippines, the Republic of Korea, Spain and Switzerland.

60 See the ICANN website for a listing of accredited registrars, at www.icann.org/registrars/accredited-list.html.

61 WIPO (2001b).

62 See ICANN website concerning DNS background and competition for domain name registration, at www.icann.org/general/background.htm#4.

63 See ICANN's Instructions for Completing Shared Registry System Registrar Accreditation Application, at http://www.icann.org/registrars/instructions.htm. For example, to prepare an application, the applicant will need to collect the company's financial information, including bank statements and insurance certificates, if available; audited annual reports if you are a publicly traded company; or other documents to demonstrate that the business has adequate working capital and commercial general liability insurance. With respect to technical information, the applicant will be required to describe current (or proposed) technical capabilities to provide SLD registration services, electronic back-up of registration data from customers, security for all registration information and continued SLD name use for SLD holders in the event the company goes out of business or ceases to operate as an accredited registrar.

64 A copy of the RRA is available at www.verisign-grs.com/registrar/dotcom/forms/rras.pdf.

65 The minimum payment security must be equal to at least the number of anticipated monthly registrations, multiplied by the number of years (minimum one year and maximum of ten years) and by the $6 registration fee. The amount of the payment security will depend upon the registrar's business plan, and a registrar may be required to increase the payment security if registration levels are consistently above the level covered by the current payment security. One further requirement linked with monetary issues is the so-called Security Instrument. This is a financial guarantee that would be employed by the registry if faced with a third-party claim in which the registrar did not indemnify VeriSign, as required by the RRA. The Surety Instrument must be for in the amount of $100,000.

66 Up-to-date information concerning the domain name market is available from Zooknic Internet Intelligence at www.zooknic.com.

67 A "defensive registration" is a registration made by a user, often a trademark owner, who has no intention of using the registered name – perhaps because the user already has its own primary dotcom domain name – but nonetheless registers it to prevent others from taking it.

68 See "Analysts worried about VeriSign's domain biz" CNET (June 3, 2002) at http://news.cnet.com/investor/news/news-item/0-9900-1028-19995061-0.html?tag=ats, referring to a monthly report of SnapNames.com, in which Verisign's database declined by more than 900,000 names in April 2002 alone.

69 All numbers are drawn from Annex B, in which 61 ICANN-accredited registrars are compared regarding their end price for the registration of a *.com* domain name for one year; see also *Online Domain Generators: Market Research Report* at http://domaingenerator.s5.com/report.htm. The sum of $35 was the price originally set that VeriSign could charge under its Cooperative Agreement with the National Science Foundation and later with the United States Commerce Department.

70 There are a number of companies that offer "domain name appraisal" services. See Lee Hodgson, *Domain Appraising – The Domain Name Fair Value Game*, at http://ecommercebase.com/printTemplate.php?aid=266.

71 ICANN is actually a registered non-profit corporation established in the United States under California law. The idea was that a private sector body would be more like the Internet itself: more nimble and efficient, able to react promptly to a rapidly changing environment, and, at the same time, open to meaningful participation by stakeholders developing policies

through bottom-up consensus. See *President's Report: ICANN – The Case for Reform*, 24 February 2002, at www.icann.org/general/lynn-reform-proposal-24feb02.htm..

72 Information about the GAC is available at www.icann.org/committees/gac/.

73 See ICANN Fact Sheet at www.icann.org/general/fact-sheet.htm.

74 ICANN's 19-member volunteer Board of Directors, has been constituted from a set of specialized technical and policy advisory groups, and through open, worldwide online elections.

75 See details about the Sponsorship Agreements for Japan and Australia at www.icann.org/cctlds/.

76 See the web page for the World Wide Alliance of Top Level Domains, ccTLD Constituency of the DNSO, at www.wwtld.org/. The CommuniquÈs and Position Statements listed at www.wwtld.org/communique/ provide a review of the interactions between ccTLDs and ICANN.

77 See web pages on the ICANN site for the Committee on ICANN Evolution and Reform, at www.icann.org/committees/evol-reform/links.htm.

78 See *World eBusiness Law Report* (2002).

79 See *Miami Herald*, International Edition, 24 June 2002, p. 3B.

80 The Committee on ICANN's Evolution and Reform has published the "Recommendations for the Evolution and Reform of ICANN" available at www.icann.org/committees/evol-reform/recommendations-31may02.htm.

81 See ICANN's website pages devoted to the ERC at www.icann.org/committees/evol-reform/links.htm.

82 See WIPO website at http://ecommerce.wipo.int.

83 See, for example, Afilias Sunrise Period and Challenge Procedure at www.afilias.info/register/dispute_resolution/sunrise_challenge_overview.

84 The First WIPO Report, at paragraph 47, noted that many commentators in the WIPO Domain Name Process suggested that ""the starting point should be the avoidance, rather than the resolution, of conflicts".

85 See a copy of Decision D1999-0001 at http://arbiter.wipo.int/domains/cases/1999/d0000-0199.html.

86 See ICANN's website for information about the UDRP, at www.icann.org/udrp/.

87 See the website of the Asian Domain Name Dispute Resolution Centre at www.adndrc.org/adndrc/index.html. ADNDRC is a joint venture between the Hong Kong International Arbitration Centre and the China International Economic and Trade Arbitration Commission.

88 See the website of CPR Institute for Dispute Resolution at www.cpradr.org/ICANN_Menu.htm.

89 See the website of the the the National Arbitration Forun at www.arbforum.com/domains/.

90 See the website of the World Intellectual Property Organization at http://arbiter.wipo.int/domains/.

91 See UDRP, para. 4.a, at www.icann.org/udrp/udrp-policy-24oct99.htm.

92 See ICANN Policy, section 4(a)(i)(ii)and(iii), at www.icann.org/dndr/udrp/policy.htm.

93 Ibid., section 4(b).

94 Ibid., section 4(c) (i)-(iii).

95 Ibid., section 5(iv).

96 Ibid., section 6(b).

97 Ibid., section 5(c). If the complainant requests a single-member panel and the respondent does not object, the provider alone assigns a single panellist from its roster to the case. Ibid., section 6(e). If a three-member panel is selected, one panellist is selected from the list of candidates provided by the complainant and the respondent. The third panellist is appointed by the provider from a list of five candidates submitted by the provider to the parties, the selection from among

the five being "made in a manner that reasonably balances the preferences of both Parties". Ibid., section 4(b) (iv). The typical approach is to allow each party to strike out up to two names from the list of five.

98 Ibid., section 4(a).

99 Ibid., section 5(a).

100 Ibid., section 5(e).

101 Id., para. 4.i.

102 The procedure also has a high rate of settlement; agreements between the parties have been reached in approximately 20 per cent of the filed cases.

103 See Geist (2001); Mueller (2001b); Stewart (2001).

104 WIPO and NAF attract the largest number of complaints and e-Resolutions attracted the lowest share of cases. Despite the highest fees, as of July 2001, WIPO had 58 per cent of the UDRP caseload as compared with 34 per cent for NAF and only 7 per cent for eResolution.

105 Kur (2001).

106 Id., at p 72

107 Donahey (2001).

108 Ibid.

109 See UDRP Rules, section 5(d).

110 See UDRP, para. 4.a.

111 See WIPO Final Report, Executive Summary.

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WIPO (1999). *The Management of Internet Names and Addresses, Final Report of the WIPO Internet Domain Name Process*, at http://wipo2.wipo.int/process1/report/finalreport.html#II

WIPO (2001b), *The Recognition of Rights and the Use of Names in the Internet Domain Name System, Report of the Second WIPO Internet Domain Name Process, at* http://wipo2.wipo.int/process2/report/pdf/report.pdf

ANNEX I

Overview of the DNS

This annex describes the basic method by which a domain name functions to direct users to a specific web site. For purposes of illustration, reference is made to the common situation, in which a user seeks to access a site on the World Wide Web (www) using the Internet browser on the user's computer.

1. After the domain name is typed into the respective input field, the first step is that the browser will send a request to a local nameserver to "resolve" the IP address of the specified web site. The local nameserver is therefore also called a DNS resolver. They are located strategically with Internet Service Providers (ISPs) or in other institutional networks.

2. As a second step, the DNS resolver will issue a request to a "root" domain nameserver, which will return the IP address of the primary and secondary nameservers responsible for the TLD (e.g., .com) of the requested web-site.

3. The DNS resolver will then contact the primary server of that TLD, where the IP address information is held in a database, and the primary server would satisfy the request from the DNS resolver.

Chart 6

DNS Resolving
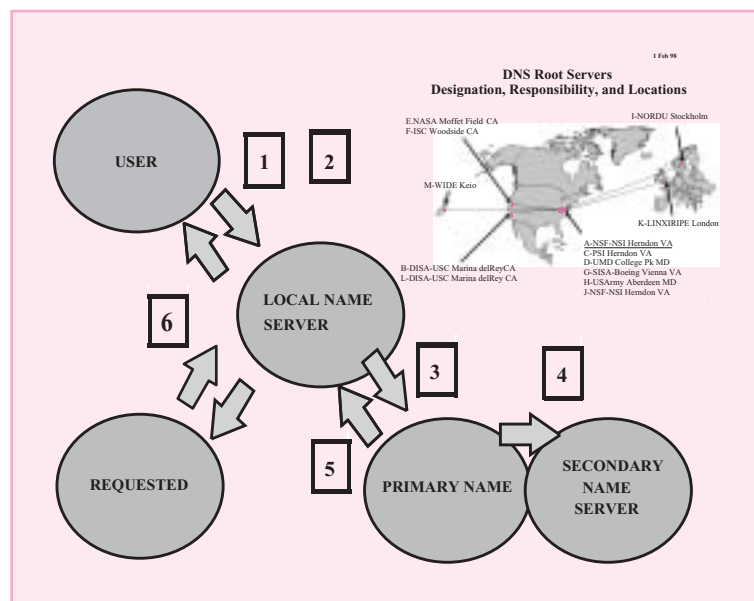
4.   In case the primary nameserver would not be available, the DNS resolver would contact the secondary nameserver which would also hold the corresponding information.

5. In either case, the DNS resolver would return to the user's browser with the IP address for the requested domain.

6. Using that IP address, the browser would then contact directly the requested web site and, finally, the web site information would be sent to the DNS resolver and could be accessed by the user.

This process can often be performed while skipping some of the steps listed above. DNS resolvers routinely download and copy (or cache) the information contained in the root servers. They also store for a period the IP addresses that have been resolved recently. Using this cache, the DNS resolver is often able to satisfy the request without contacting the root server. In fact, the cache function is essential on the Internet for reasons of performance. The root servers could not properly handle billions of requests a day and, if they were required to do so, it

ANNEX II

Registrar Prices for Domain Name Registration
Status as of 15/06/02

Source concerning information Registrar/Country/URL:

http://www.icann.org/registrars/accredited-list.html

LEGEND:

*:   two year minimum registration

**:   two domain registrations minimum

35(35): 35 = prices 15/06/02; (35) = price September/October 2001

URL: URL could not be accessed on the date of last visit (15/06/02)

not yet: registrar does not yet offer registration services (15/06/02)

no rg-s: registrar does not offer "pure" registration services, mainly because company only offers "package" serv-
             ices which include domain name registration services

wsale: wholesale only

lang.:   no information because web side is run in language other than English/French/Spanish

hosting: registrar only offers hosting services, no "pure" registration services

.info/.pro:registrar only offers registration services for these TLDs, not for .com domain

members:members only; need to lock in

all prices are the prices for one year and also of the first year of registration

all USD prices are approx. (< 10 USD the exact prices are listed)

all web-sides last visited on 15/06/02

no special offers are listed

Registrar Prices for Domain Name Registration (.com only)

Registrar	Country	appr. US$ domain/ year[1]	URL
! AholaNIC LLC	United States	17*	www.alohanic.com
#1 Domain Names International, Inc. dba 1 dni.com	United States	URL(35)	www.1dni.com
@Com Technology LLC	United States	not yet	www.AtComTechnology.com
007Names, Inc.	United States	15	www.007names.com
1 eNameCo	United States	17(17)	www.eNameCo.com
123 Easy Domain Names, Inc. dba Signature Domains	United States	35(15)	www.signaturedomains.com
123 Registration, Inc. d/b/a 123registration.com	United States	35(35)	www.123registration.com
1stDomain.Net, a division of G+D International LLC	United States	25*(25)	www.1stdomain.net
2Day Internet Limited dba 2day.com	New Zealand	not yet	registrar.2day.com
A Technology Company, Inc. dba namesystem.com	Canada	12(15)	www.namesystem.com
AAQ.COM, Inc.	United States	.info	www.aaaq.com
Abacus America, Inc. d/b/a Name4ever	United States	20(20)	www.names4ever.com
ABR Products Inc. dba Nitin Networks	United States	35	names.nitin.com
Abu-Ghazaleh Intellectual Property (AGIP)	Jordan	no rg-s	wwww.agip.com
Active ISP ASA	Norway	35	www.activeisp.com
Address Creation	United States	15(15)	www.addresscreation.com
Adgrafix Corporation	United States	15	www.adgrafix.com
Alice's Registry, Inc.	United States	35(35)	www.ar.com
All West Communications, Inc. DBA AWRegistry	United States	35(35)	www.awregistry.com
Alldomains.com	United States	35(35)	www.alldomains.com
America Online, Inc.	United States	no rg-s	www.aol.com
Amercian Domain Name Registry	United States	-	
Antelecom, Inc.	United States	20	www.antelecom.net
Arsys Internet, S.L. dba soloregistros.com	Spain	30	www.soloregistros.com
Ascio Technologies, Inc.	Denmark	no rg-s	www.ascio.com
BB Online UK Limited	United Kingdom	18(18)	www.nominate.net
Blueberry Hill Communications, Inc. d/b/a 4Domains.com	United States	25	www.4domains.com
BrookMyName SAS (formerly Worldnet)	France	30	www.bookmyname.com
British Telecommunications (BT plc)	England	no rg-s	www.bt.com
BulkRegister.com	United States	wsale.	www.bulkregister.com
C I Host, Inc.	United States	URL	www.cihost.com
Capital Networks Pty Ltd.	Australia	20(20)	www.totalnic.net
CASDNS, Inc.	United States	25	www.CASDNS.net
Catalog.com	United States	35(35)	www.catalog.com
Centergate Research Group, LLC	United States	no rg-s	www.centergate.com
Central Registrar dba Domainmonger.com	United States	17	www.domainmonger.com
Computer Data Networks dba Shop4domain.com and Netonedomains.com	Kuwait	22(20)	www.shop4domain.com
CORE Internet Council of Registrars	Switzerland	no rg-s	www.corenic.org
Corporate Domains, Inc.	United States	.info	www.corporatedomains.com
Cronon AG Berlin, Niederlassung Regensburg	Germany	wsale.	www.cronon.org
CSL Computer Service Langenbach GmbH d/b/a joker.com	Germany	12(24)	www.joker.com
Cydian Technologies	United States	15	www.Cydian.com
Deutsche Telekom AG	Germany	no rg-s	www.dtag.de/katalog-online/ domain

[1] prices listed in brackets indicate the price Sep/Oct 01.

Registrar	Country	appr. US$ domain/ year[1]	URL
DevelopersNetwork.com., Inc. dba DomainInvestigator.com	Canada	15	www.DomainInvestigator.com
Direct Information Pvt Ltd d/b/a Directi.com	India	8.50	www.directidomains.com
Dodora Unified Communications, Inc.	United States	no rg-s	www.dodora.net
Domain Bank, Inc.	United States	35(35)	www.domainbank.com
Domain Intellect Pty Ltd.	Australia	no rg-s	www.domainintellect.com
Domain Registration Service, Inc. dba dotEarth.com	United States	12*(10)	www.dotEarth.com
Domain The Net Technologies Ltd.	Israel	lang.	www.DomainTheNet.com
Domaininfo AB, aka domaininfo.com	Sweden	25*(25)	www.domaininfo.com
Domain-It!, Inc. dba Domain-It!	United States	35*	www.domainit.com
DomainName, Inc.	United States	30	DomainName.com
DomainPeople, Inc.	Canada	35(35)	www.domainpeople.com
DomainPro, Inc.	United States	.pro	www.domainpro.com
DomainProcessor.com, a division of Funpeas Media Ventures, LLC	United States	20	www.DomainProcessor.com
DomainRegistry.com.Inc.	United States	30(30)	www.DomainRegistry.com
DomainSite.com, Inc.	United States	13(13)	www.domainsite.com
DomainZoo.com, Inc.	United States	20(20)	www.domainzoo.com
DomReg Ltd. dba ATLNTD.com	Russia	lang.	www.atlntd.com
Dotster, Inc.	United States	15(15)	www.dotster.com
Eastern Communications Company Limited	China	URL	www.reg.eastcom.com
Easyspace Limited	United Kingdom	25(17)	www.easyspace.com
Echo, Inc.	Korea	lang.	www.domainrg.com
eMarkmonitor Inc. dba Markmonitor	United States	wsale	www.markmonitor.com
eNom, Inc.	United States	30(30)	www.enom.com
EPAG Enter-Price Multimedia AG	Germany	18*(25)	www.epag.de
Equitron Inc. d/b/a DomainNameRegistration.com	United States	35*	www.domainnameregistration. com
ExtremeNames.com	United States	URL	www.extremenames.com
Gabia, Inc.	Korea	lang.	www.name7.com
Gal Communication (CommuniGal) Ltd.	Israel	13	www.galcomm.com
Gandi SARL	France	URL(12)	www.gandi.net
GKG.NET, INC. (Formerly GK Group L.L.C.)	United States	9.99(10)	www.gkg.net
Global Media Online Inc. d/b/a Discount-Domain.com and Onamae.com	Japan	lang.(35)	www.interg.or.jp
GlobalHosting, Inc. d/b/a SiteRegister	United States	not yet	www.siteregister.com
Globedom Datenkommunikations GmbH, d/b/a Globedom	Austria	wsale.	www.globedom.com
Go Daddy Software, Inc.	United States	8.95(9)	www.godaddy.com
Future Media Network	Japan	lang.	www.fm-net.ne.jp
HANGANG Systems, Inc. dba Doregi.com	Korea	14	www.doregi.com
HiChina Web Solutions Limited	China	URL	www.net.cn
Hosting-Network, Inc.	United States	not yet	www.hosting.network.com
I.D.R Internet Domain Registry LTD.	Israel	12	www.idregister.org
iHoldings.com, Inc. d/b/a DotRegistrar.com	United States	15**(14)	www.DotRegistrar.com
IKANO Communications, Inc.	United States	no rg-s	www.ikano.com
INAMES Corp.	Korea	URL	www.i-names.co.kr
InnerWise, Inc. d/b/a ItsYourDomain.com	United States	15(15)	www.itsyourdomain.com
InterAccess Co.	United States	-	now www.hosting.com
Interactive Telecom Network, Inc.	United States	not yet	ww.domaindomain.com
Intercosmos Media Group, Inc.	United States	15(15)	www.directnic.com

Registrar	Country	appr. US$ domain/year[1]	URL
Interdomain S.A.	Spain	30	www.interdomain.org
Internet Domain Registrars d/b/a Registrars.com	Canada	-(35)	*now* www.verisign.com
Internetplaza City Co., Ltd	Korea	lang.	www.inplaza.net
Internetters Limited	United Kingdom	34*	www.internetters.com
Key-Systems GmbH d/b/a domaindiscount24.com	Germany	12(12)	www.domaindiscount24.com
Korea Information Certificate Authority, Inc. dba DomainCA.com	Korea	no rg-s	www.domainca.com
Marksonline, Inc.	United States	no rg-s	www.marksonline.com
Melbourne IT Ltd trading as Internet Names Worldwide	Australia	35(35)	www.melbourneit.com
Mobilcom City Line d/b/a topnet AG	Germany	no rg-s	www.topnet.de
Mr. DomReg.com Inc.	Canada	25(25)	www.mrdomreg.com
Namebay	Monaco	12(12)	www.namebay.com
NameEngine, Inc.	United States	no rg-s	www.nameengine.com
NameScout Corp.	Barbados	25*	www.namescout.com
Namesdirect.com, Inc.	United States	30(30)	www.namesdirect.com
Namesecure.com, Inc.	United States	15(35)	www.namesecure.com
Namezero.com, Inc.	United States	20	www.namezero.com
Net Searchers International Limited	United Kingdom	no rg-s	www.netsearchers.com
NetBenefit plc aka NetNames	United Kingdom	49*(35)	www.netnames.co.uk
Netblue Communications Co., Ltd.	Korea	lang.	www.domainshock.com
Neteka Inc. dba namesbeyond.com	Canada	18	www.namesbeyond.com
Netpia.com, Inc.	Korea	lang.	www.ibi.net
Network Solutions, Inc. Registrar	United States	35(35)	www.networksolutions.com
New Dream Network, LLC dba Domainitron.com	United States	25	www.domainitron.com
Nominalia Internet S.L.	Spain	34(37)	www.nominalia.com
Nordnet	France	35	www.nordnet.net
Omnis Network, LLC	United States	15(20)	www.omnis.com
OnlineNIC, Inc.	United States	wsale.	www.onlinenic.com
OVH	France	8.90	www.ovh.com
pair Networks, Inc. d/b/a pairNIC	United States	19	www.pair.com
Parava Networks, Inc. d/b/a RegistrateYa.com and nAAme.com	United States	35(35)	www.parava.net
pAsia, Inc.	Taiwan	lang.	www.pasia.com
Philippines Registry.Com, Inc.	Philippines	35*	www.Philippineregistry.com
Polar Software Limited d/b/a signdomains.com	India	9.95	www.signdomains.com
Primus Telecommunications Pty Ltd trading as PlanetDomain and PrimusDomain	Australia	15(35)	www.planetdomain.com
PSI Japan	Japan	15(67)	www.psi-domains.com
PSI-USA, Inc.	United States	no rg-s	www.psi-usa.com
R & K Global Business Services d/b/a 000Domains.com	United States	14	www.000domains.com
Register.com, Inc.	United States	35(35)	www.register.com
REGISTER.IT SPA	Italy	35	we.register.it
RegistrarsAsia Pty Ltd	Australia	39	www.registrarsasia.com
Registration Technologies, Inc.	United States	15	www.RegistrationTek.com
Research Institute for Computer Science, Inc.	Japan	lang.	www.rics.co.jp
SafeNames Ltd.	United Kingdom	35	www.safenames.net
Schlund+Partner AG	Germany	hosting	www.schlund.de
Secura GmbH	Germany	30(60)	www.domainregistry.de
Shaver Communications, Inc.	United States	no rg-s	www.web2010.com
SiteName Ltd.	Israel	13	www.sitename.com

Registrar	Country	appr. US$ domain/ year[1]	URL
Stargate Communications, Inc.	United States	14(16)	www.stargateinc.com
Talk.com, Inc.	United States	no rg-s	www.talk.com
The NameIT Corporation d/b/a AITdomains.com	United States	19(19)	www.aitdomains.com
The Registry at Info Avenue d/b/a IA Registry	United States	13(15)	www.IARegistry.com
TierraNet Inc. DBA DomainDiscover	United States	25*(25)	www.domaindiscover.com
TLDs Inc. d/b/a SRSplus	United States	wsale.	www.srsplus.com
Today and Tomorrow Co., Ltd.	Korea	URL	www.tt.co.kr
Total Web Solutions Limited Trading as TotalRegistrations	England	12(12)	www.totalregistrations.com
Transpac	France	no rg-s	www.oleane.net
Triara.com S.A. de C.V.	Mexico	no rg-s	www.triara.com
Tucows Inc.	Canada	hosting	www.tucows.com
Tuonome.it.srl	Italy	15	www.tuonome.it
Universal Registration Services, Inc. dba NewDentity.com	United States	members	www.newdentity.com
USA Webhost	United States	15	www.usawebhost.com
Venture.com Inc. dba DomainCity.com	Korea	not yet	www.domaincity.com
Virtual Internet Plc.	United Kingdom	15(25)	www.vi.net
Wild West Domains, Inc.	United States	not yet	www.wildwestdomains.com
Wooho T & C Ltd., d/b/a rgnames.com	Korea	lang.	www.rgnames.com
Xin Net Corp., Ltd.	China	lang,	www.chinadns.com
Yesnic Co., Ltd.	Korea	18(18)	www.yesnic.com

Chapter 3

GENDER, E-COMMERCE AND DEVELOPMENT

A. The relevance of gender

The role of new information and communication technologies (ICT) and e-commerce in driving the global economy is widely recognized: ICT and the Internet reach many people, have a wide geographical coverage and are efficient in terms of time and cost. They facilitate access to markets, commercial information, new processing technologies and knowledge. But do women have equal access to these new technologies and the Internet? Does e-commerce enhance business opportunities for women, especially in the developing countries? What are some of the promising new employment opportunities for women in the ICT sector, or does it replicate patterns of inequality elsewhere in the job market? And what are the main barriers women have to overcome to participate actively in the digital economy?

These questions are increasingly being addressed by women's advocacy groups and non-governmental organizations (NGOs) working at the grass-roots level in both developed and developing countries, as well as by the international community in general. Among the international organizations, the International Telecommunication Union (ITU) has taken a leading role in bringing the gender dimension into the debate on the digital divide and ICT policy making.[1] Through its Working Group on Gender Issues, and in cooperation with other UN bodies, it is actively working towards integrating the gender perspectives into the World Summit on the Information Society (WSIS), to be held in Geneva (2003) and in Tunis (2005).

Much of the work done at the international level is focusing on how ICT can become a tool for the advancement and empowerment of women, including in areas such as education and training, health, participation in public life and the productive sphere. This chapter will identify the economic opportunities created for women in the developing countries through the use of ICT and e-commerce, as well as the barriers they face when entering the digital economy. Central to this debate is the recognition that the digital econ-

omy poses opportunities as well as challenges for women that are different from those for men, based on their different roles and positions in the family and society. For example, ICT and e-commerce work well for women entrepreneurs (who in many developing countries account for the majority of owners of small, medium and micro enterprises), allowing them to save time and costs while trying to reach out to new clients in domestic and foreign markets. As this chapter will show, new job opportunities created by ICT through outsourcing in the services sector are also benefiting women, who account for significant shares of the workforce in the information technology (IT)-enabled industry in developing countries.

On the other hand, women often face greater barriers than men in receiving education and training that can equip them with computer literacy, foreign language and business skills. In the developing part of the world, parents tend to invest more in the education of the male rather than the female child. Women also often find it more difficult to engage in new forms of self-employment created by ICT, such as telekiosks or cybercafes if they do not have the same access as men to family property or institutional finance. Women make up the majority of the rural poor in the developing countries, where access to ICT infrastructure is less available than in urban areas. Given their increased responsibilities at home, they have less time to access the technologies outside their homes or to enhance their IT, language or other skills required by the information economy. Few women work in the higher-skilled areas of the IT-enabled industry and even those in lower-skilled areas are often hard to retain once they become of childbearing age and social and cultural norms prompt them to leave their jobs and attend to the young and elderly.

This chapter will address these issues in more depth. Section B will critically examine the extent to which e-commerce and ICT provide women with new economic opportunities as small business owners or in ICT-related employment, such as call centres, teleworking or back-office remote/offline work. Section C will focus on one of the key factors affecting women

in the digital economy: skills and training. It will explore what kinds of skills are required by the digital economy and which skills women need to acquire in order to fully participate in the economic and employment opportunities offered by ICT. Section D will address other constraints that women may face, such as access to technologies, availability of finance, foreign languages and cultural obstacles. Section E will provide some conclusions and recommendations for including gender issues in ICT policy-making.

Unfortunately, there is very little research and documentation on the impact of ICT and e-commerce on women in the developing countries. Whatever data and statistics exist, they are often not disaggregated by gender. Nevertheless, this chapter makes an effort to draw from the existing literature and provide as many examples as possible that will give insights into the opportunities and challenges faced by women in the digital economy. Most of the examples cited in this chapter are taken from the Asian region. This is partly explained by the research done so far on the subject, which is heavily focused on Asia, and partly by the fact that certain IT-enabled services have grown exponentially in the Asian region, many of which employ a large number of female workers.

B.   Digital opportunities for women

Information and communication technologies provide a number of new job opportunities for women, or businesses opportunities of which women could avail themselves. This section will explore some of these opportunities by looking first at the possibilities which e-commerce could offer to small women business owners, and second at how ICT could create new employment opportunities for women through tele-working and IT-enabled services, both of which employ a significant proportion of female workers.

1.   Women as small business owners

E-commerce offers some attractive possibilities for small business owners in the developing countries' business-to-consumer (B2C) or retail sector, many of the enterprises in which are owned by women. Numerous examples have been cited as digital opportunities for women entrepreneurs along the models of telecentres in Senegal and Morocco, phone shops in Ghana, Internet cafes or kiosks in Thailand and Malaysia, and the Grameen Phone in Bangladesh. The

latter has been cited as a successful example of women entrepreneurship, where financing from the Grameen Bank allows women to buy cellphones and provide mobile pay phone services in their shops or local markets at a mutually agreed mark-up with Grameen Telecom.[2] These IT-enabled businesses have the advantages of low capital and skills requirements (see section D.3).

Aside from telephony services, women's handicrafts could also be developed using B2C, although difficulties in terms of marketing and management skills, and supply and delivery logistics need to be addressed. A number of success stories concerning B2C endeavours are to be found in South Asia, Latin America, Africa and the Middle East. In India, an e-marketplace called IndiaShop eliminated the middlemen in the selling of saris. One woman allegedly sold a silk sari she tailored for $ 1,100, a price that is way above an average Indian's annual income.[3] In Peru, a nationwide network of housewives called Tortasperu, which is involved in baking confectioneries sold over the Internet, showcased lucrative work for women at home taking care of children yet providing the country with much needed foreign exchange.[4] Ethiopia has opened a gift shop that sells, using the Internet, traditional Ethiopian costumes, food items and spices produced by women.[5] Finally, handmade products made by women artisans in Egypt, Jordan, Lebanon, Morocco and Tunisia are sold through a virtual shop called Elsouk.[6]

These digital opportunities are particularly significant for women in Asia, considering that women head 35 per cent of small and medium-sized enterprises (SMEs) (Brisco, 2002). It has been reported that in China women initiate about 25 percent of new business start-ups and in Japan four out of five small business owners are women. The main advantage of the Web for small home-based businesses is the information and networking opportunities that would make these endeavours profitable rather than marginal. As Brisco (2002) observes, "The ability of women to earn income at home while raising a family – with the technology to communicate inexpensively with customers around the world, and handle accounting and order processing online – is adding to the attraction of the Internet for women".

Despite these success stories in e-retailing, it will be necessary to evaluate carefully in which segments of e-commerce women's opportunities lie. Women's prospects depend primarily on the trading strength of the countries concerned. In spite of the publicity given to

e-retailing, its scope and spread in the poorer parts of the world have remained small. As discussed earlier in this report (see chapter 1), the volume and value of B2B (business-to-business) trade and commerce far exceed the volume and value of B2C worldwide.

It is also important to remember that women usually sell commodities such as garments or handicraft products, the delivery of which cannot take place online. In such cases, the use of the Internet is confined to advertising, ordering and possibly collecting payments; hence women have to develop strategies to build consumers' confidence in the quality of their goods. The limited evidence available so far shows that some women have also found a market niche in the buying and selling of information rather than tangible goods. In addition to the example of the Grameen Phone cited earlier, women in India and Malaysia use online delivery of their services as freelance journalists to newspapers and other publishers (Mitter, 2001).

2. ICT-enabled services

More promising opportunities for women lie in the B2B segment of e-commerce. The advances in computer and communication technologies have made it possible to transfer digitized data online when there is an adequate supply of infrastructure and bandwidth. Through the use of networking technologies, large amounts of information can be transported at very low cost from the companies' core offices to satellite or subcontracting units. This possibility has led companies to externalize and decentralize non-core sections of business operations to distant and often cheaper locations. The targeted sites are usually the ones that offer the promises of a cheap, skilled computer- and English-literate workforce.

This phenomenon explains why companies in OECD countries outsource service operations to countries such as India or Malaysia (Ng, 2001; Gothoskar, 2000). The International Data Corporation (IDC) estimated that spending on IT outsourcing had reached $ 56 billion in 2000 and would exceed $ 100 billion by 2005.[7] There has been some evidence of companies in developing countries outsourcing operations within the country as well as to other developing countries where wages are even cheaper. Some of the Indian companies, for example, look towards Nepal for the requisite workforce at times of peak demand, particularly from abroad. In Malaysia, subcontracting or outsourcing takes place primarily within national boundaries.

There is a relationship between the availability of a skilled, English-speaking female workforce and where outsourcing normally happens. From this, one can also propose the hypothesis of the existence of a relationship between the availability of a skilled female workforce and foreign direct investment in information processing work in the developing countries. The software services sector in countries such as India and the Philippines could support this hypothesis. The salary differences between the United States and India, or the Philippines, for similar skills are considerable.[8] Yet these differences cannot fully explain the absence of relocation of software services to countries such as Bangladesh or Uganda where salaries are even lower. In addition to the requisite skills, the success of replicating the experience of India or Philippines depends on creating the right policy framework (ESCAP, 2001).

Software and IT-enabled services could be export-oriented as in the case of India and the Philippines; they could also be domestically oriented as is in the case of Malaysia, China and Brazil. The global expansion of those services has broadened the job prospects of women in new areas. The limited statistics that we have so far indicate that women in some of the Asian and Latin American countries occupy more than 20 per cent of professional jobs in software services. This figure is higher than in any other field of engineering (Arun and Arun, 2002; Ng, 2001, Mitter, 2000, Gaio, 1995).

Recent research and projections have indicated that the prospects for women lie more in the IT-enabled services than in software services. The worldwide demand for IT-enabled services or business process outsourcing (BPO) is expected to grow at a dramatic rate in the coming decade, reaching $ 611.4 billion by the year 2005.[9] India hopes to capture a large share of this newly created market. With revenues of $ 870 million from IT-enabled services in 2000-2001 and an annual growth rate of 66 per cent, it currently has the potential to address 38 per cent of that market.[10] Again, there are no gender-disaggregated statistics on employment arising out of these outsourced IT-enabled services from the developing world. According to the Deputy Director of the Confederation of Indian Industries (CII), in India at least 40 per cent of these newly created jobs are given to, and taken by, women.[11]

Remote services or IT-enabled services largely consist in the relocation of back-office operations.[12] One has to be cautious about the future, however, given that there are various types of back-office services requir-

ing different levels of skills from women and men. The increasing trend towards outsourcing by major American and European corporations entails jobs ranging from those at the lower end of the skills level where women are mostly employed, such as data entry and data capture, to those at the higher end such as software programming, geographical information systems (GIS) and systems analysis. There is a discernible trend towards hiring women for operations that require less complex skills (box 4).

Box 4

Gender structure in back-office services (India)

Routine: requiring basic skills – **women predominate**

- Data capture and processing
- Customer call centres – for routine queries, order taking and referrals
- Hotel or rental car reservations
- Virtual service centres (e.g. home delivery pizza companies)

Discretionary: requiring technical training and problem solving – **women predominate**

- Data verification and repair (e.g. optically scanned documents)
- Claims processing
- Mailing list management
- Remote secretarial services
- Customer call centres – account queries and after-sales support

Specialized: requiring specific expertise and managerial authority – **men predominate**

- Accounting, bookkeeping, payroll processing
- Electronic publishing
- Website design and management
- Customer call centres – problem/dispute resolution
- Technical transcription (e.g. medical, legal)
- Medical records management
- Technical online support
- Indexing and abstracting services
- Research and technical writing

Source: Adapted by Swasti Mitter from I.T. Information Technology, vol. 11, no 2, December 2001, EFY Enterprises Pvt Ltd, New Delhi, p. 29.

Box 4, as well as other research carried out in India, indicates that women are concentrated in those areas that need routine or discretionary skills (Mitter and Sen, 2000), whereas women are less visible in specialized areas of back-office operations. It is worth monitoring this gender differential as the next round of technological changes, for example in the areas of voice recognition and image processing by computers, may make some of these skills less saleable in the international market. For the benefit of the women and for augmenting or retaining the competitive advantage of countries, policy makers need to ensure that women receive the same opportunities and encouragement to acquire skills that could equip them for more complex and specialized jobs.

The Outsourcing Institute, which developed the Outsourcing ICT Index for the United States based on a survey of buyers and sellers, has observed a changing pattern of areas being outsourced to Internet and intranet services such as network management, data centre management, and end-user support and web hosting, owing to the increase in e-commerce activi-

ties.[13] Thus, if women are to increase their share in the above services, they have to be increasingly exposed to and trained in Internet skills, in contrast to the early phase of the ICT-related task of assembling electronics, as found in Asia and Latin America.

Teleworking: home-based or institution-based?

The outsourcing or externalizing of business processes to distant units within or across the national boundary could range from satellite offices, such as call centres, to homes of employees or vendors or to offices of customers or clients. With the computer and a modem, a woman can be connected to the head office and can perform her professional work from a distant site such as a neighbourhood centre or her own home. This is possible as long as her work involves storing, processing, retrieving and delivering digitized information. This new mode of working is known as teleworking and has received much attention, particularly in the context of women's career prospects.[14] The use of ICT in itself can, in theory, offer a solution that is attractive both to women and to the corporate sector interested in retaining skilled women employees (box 5).

Box 5

Changing modes of working could be of benefit to the corporate sector

I look forward to the potential of teleworking for retaining our highly trained, highly skilled women employees in business during their childbearing and childbearing stage. In my organisation, we value women's skills and contribution and regret if they have to leave their profession because of the inflexibility in demands made on their time. Perhaps teleworking could find the solution whereby women can keep in touch with the changing technology and perform at least some of the functions from home.

Source: Speek delivered by F.C. Kohli, Vice President of the Tata Consultancy Services, Mumbai, India, at the Final Workshop on Teleworking and Teletrade in India; organized by UNU-INTECH, Maastricht, and the National Centre for Software Technology, Mumbai, December 200.

"Tele" implies distance and teleworking refers to ICT-mediated distant work. The term covers both home-based work or telecommuting and institution-based work as carried out in call centres, neighbourhood centres or satellite offices.

Home-based teleworking could, in theory, enhance the participation of women in the digital economy as it allows a certain flexibility in both the timing and location of work (Mitter, 2000; Mitter and Efendioglu, 1997). Women with caring responsibilities at home welcome this flexibility, but not without reservation. Whereas some women appreciate the opportunities that teleworking brings, the majority fear that the home-based work will deprive them of the status of working women and hinder their professional or business efficiency (boxes 6 and 7).

Box 6

Some women enjoy teleworking

Exteacher Rani, who majored in the Tamil language, taught for oneyear, got married, and had a child in 1996. Because she could not obtain any domestic help, she resigned from the teaching profession to take care of her child. She is now teleworking from home, working as a Tamil translator for a multimedia company. She stresses that she is working because she loves to, rather than for the money. She is disciplined in her work and meets deadlines. Rani, who owns her own computer and printer, is happy teleworking as it saves time and energy. "Other things can be done at the same time; there is more control in my work and it is more flexible. I would not have chosen to work if I could not do it from home."

Source: Mitter (2001, p.23).

Box 7

Other women feel concerned

Due to the prevailing notions that home-based work is essentially women's work, it is likely that companies adopting telework systems would prefer women. Women, too, might be tempted to opt for telework as it enables them to manage their multiple roles effectively. While the system provides women with the possibility of managing their homes and earning a living, there is a danger that their contribution to society will remain invisible. It would not change their existing gender inequity in the home or the prevailing stereotypes that domestic work is essentially women's work.

Source: Mitter (2001, p. 23.)

Surveys of home-based teleworking carried out in Mumbai and Kuala Lumpur revealed that women had a preference for institution-based teleworking as in call centres (home-based teleworking accounted for only 1.0 and 0.35 per cent respectively). According to Ng and Khoo (2000), in Malaysia, "interviews with women's groups indicated that the (institution-based) centres, commercial and state sponsored, may be the ideal site for externalised work that will allow women (and men) to combine work with collective childcare facilities; enable women (and men) with peer groups and thus allow them to acquire and improve their tacit skills; and provide facilities for state and corporate sector supported vocational training in the field of computer literacy".

Managerial concerns may also explain the low prevalence of home-based teleworking in India and Malaysia. In a survey of management perception of teleworking in Malaysia, most respondents reported that in Malaysian culture face-to-face interaction was essential (Ng, 2001). In India too, research revealed a cautious attitude on the part of management towards home-based teleworking. In the financial sector, for example, companies find it prudent to outsource work to call centres rather than to teleworkers.

In institution-based teleworking it is easy to monitor and supervise employees in the traditional way, whereas widespread implementation of home-based teleworking will require a fundamental shift in the culture of management from direct supervision to a basis of trust. For self-employed and freelance workers, home-based teleworking will involve self-management and time management skills. It is important for women to acquire these skills in order to avoid being distracted by household chores or over working while teleworking from home.

There is no uniformity in the preference for types of telework among women in the developing countries. Age and stage of life are key factors in moulding women's choice regarding the type of telework. In Mumbai, while young women work in call centres or offices of foreign airline companies in the export processing zones, older women, with young children, opt for and receive home-based telework. Companies such as Datamatics – a rapidly growing software house – receive assignments from their international clients (box 8). In turn, they pass these to women teleworkers who work from their homes, mostly online and with their own computers. These home-based teleworkers comprise a wide range of women: housewives, doctors, lawyers and chartered accountants. All that they have in common is that they had to give up regular employment at some stage for the sake of their families. Teleworking gives them a welcome and much-needed opportunity to be in touch with the world of work. Yet it is difficult to ensure that these women can progress, with adequate access to training and childcare, to high value-added jobs (Mitter, 2000).

The experience of Malaysia is similar. "The case studies in software, as well as in printing and publishing, indicate that some women often opt for and find satisfaction in home-based work, either as freelancer or as employees. This happens in a particular phase of their life cycle, especially when there are inadequate child care facilities" (Ng and Khoo, 2000). The provision of childcare thus remains a key issue in recruiting, retaining and retraining women in the new economy, as it was in the old economy.

Box 8

Management perception of teleworking (India)

The case of Datamatics, India

Teleworking was introduced in Datamatics in 1990 with 10 teleworkers. Over the last nine years the number of tele-workers has grown to 600, mainly owing to enhanced telecom facilities and network infrastructure.

Datamatics prefers women teleworkers, though the prerequisites for applying for the job are quite strict. However, a recent advertisement placed by Datamatics received an overwhelming response and they received more than 3,000 applications. The company has devised a unique method to monitor the work carried out by the teleworkers. Each type of work is given to two or more people who are unaware of each another. The company uses a software package that compares the completed work submitted by the teleworkers with the original in order to identify if there are any mis-takes. Work that is found to be 100 per cent accurate is accepted. Hundred per cent redundancies are built into the sys-tem. This method of scrutinising has been found very effective over the years.

Source: Gothoskar (2000, p. 2287).

Call centres

With regard to institution-based telework, call centres have received much attention from policy makers, donor agencies and UN bodies. In some countries, such as India, Malaysia, the Philippines and Jamaica, call centres have already proved to be a success in allowing women to participate in the digital economy.

The proportion of women employed by call centres varies from 40-70 per cent (Gothoskar, 2000; Ng, 2001). They tend to be between 20 and 25 years of age and in most cases this is their first job. In view of the projected growth of these call centres, women are likely to benefit at least numerically from this segment of e-commerce.

However, the question of sustainability needs to be addressed. There are risks of a reduction in demand for outsourcing call centre services to developing countries resulting from the improvement of voice recognition by computers.[15] In addition, changes in technology may alter the volume and the nature of call centre service provision. Instead of providing a central base for teleworking, call centre services may be pro-vided virtually, supported by fast data communication linkages among a network of home-based teleworkers. Again, the deployment of web-based technologies may reduce the market for call centre service provi-sion. In banking, for example, customers may conduct their own transactions. In this new environment, instead of focusing on a single task, institutions such as call centres or satellite offices will be engaged in multidimensional tasks. Women therefore need to have access to appropriate training and lifelong educa-tion in order to retain their share in this changing mar-ket.

Second, there is a prospect of "burn out" syndrome. As Ng (2001) reports, "While most call centre workers expressed job satisfaction, there were also complaints about how stressful the job was. One reason given was the highly competitive environment as incentives are given to top performers in call success rates (for exam-ple, in debt collection efforts), implying reprimands and threats of dismissals for low success rates. These employees have to deal most civilly with their recipi-ents many of whom tend to be abusive or even hyster-ical. While the call centre industry has the ability to provide young women with the means of entry into the banking sector, the danger lies with it being a dead-end job, with limited career promotion prospects."

For women, call centres located on the outskirts of cit-ies reduce the need to commute; for the management they offer the possibility of adequate supervision for ensuring quality control. Call centres, by decentralizing business and work, bring new opportunities for women, away from the city centres, to be included in the B2B segment of e-commerce.

C.   Capacity building: rationale for a "gender lens"

The previous examples have demonstrated that ICT and e-commerce can create a number of promising economic opportunities for women in developing countries. They have also pointed to the various obstacles that need to be addressed in order to enhance women's participation in the information economy. One of the most important impediments to women's engaging in ICT-enabled employment possibilities relates to skills and training and will be considered in this section.

Assessing the parity between women and men in the digital economy is a complex task. As table 14 shows, in the software sector, women in Malaysia are becoming numerically almost as visible as men. However, they are generally clustered in the low-skilled end of the hierarchy with little prospect of career progression, while male workers dominate the technical and managerial occupations.

Table 14

Employment pattern of software services companies in Malaysia in 1999

Company	Co. A*		Co. B		Co. C		Co. D		Co. E		Co. F		Co. G		Co. H		Co. I		Co. J		Total	
Level in organization	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Management	17	0	12	3	10	0	8	5	1	0	7	6	3	0	3	3	1	0	1	0	63	17
Executive	37	22	45	25	12	7	32	18	0	0	6	1	12	5	18	4	23	0	45	6	230	88
Non-executive																						
Technical	7	0	9	0	0	0	58	4	0	0	6	0	0	0	0	0	0	0	0	0	80	4
Administrative	3	17	0	11	0	3	6	20	0	0	0	0	0	0	0	2	10	0	3	1	22	54
Clerical	27	109	0	0	0	0	7	12	0	1	0	3	0	0	0	0	0	0	0	0	34	141
Dispatch	0	016	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Total	91	164	66	39	23	10	111	59	1	1	19	10	15	5	21	9	34	0	49	7	430	304

Source: Ng (2001, p. 115).
M = male; F= female
Notes:
1. Management includes directors, managers, consulting managers and assistant managers.
2. Executive includes systems analysts, analyst programmers, executives, network specialists, consultants, Internet technicians, engineers, project leaders, project team leaders, finance personnel and accountants.
3. Non-executive is divided into two categories:
     i) Technical – technical writers, computer operators and conversion operators;
     ii) Administration – administrators/supervisors, support coordinators, executive assistants, secretaries and receptionists; clerical (data entry clerks and clerical staff); and dispatch.
* Company A has a total of 92 full-time employees and 163 contract staff (11 supervisors and 152 clerks).

Why is there such an uneven distribution of male and female employees across ICT-related occupations and what could be done to address this? The training policies in developing countries are in theory gender-neutral. In practice, however, they are often geared to the life cycle and aspirations of men. Women, particularly of childbearing age, find it difficult to cope with the training given either by employers or by private sector institutions. The drop-out rate for women even in the high-skilled software services sector has been alarming, even in areas where there is a need for trained personnel (Arun and Arun, 2002; Ng, 2001). A survey undertaken in the software industry in Kerala, India, documents how women themselves settle for a less demanding position in order to have more time for their family and to maintain the overall quality of life (see box 9).

1.   Worldwide demand and supply of ICT-related skills

The major ICT markets are now faced with a serious shortage of IT skills. IDC (2000) estimated a total of 3.7 million IT jobs in 2000 (excluding people who used some IT expertise in their main functions). In

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Box 9

Reasons for women leaving highly paid jobs: Examples from software companies in Kerala, India

Normal working hours were eight hours per day for six days a week. However, employees from all categories felt that they spent more time than this in the work place, largely because of tight project deadlines and the need to put in extra hours to meet those deadlines. Both men and women with children and with other domestic responsibilities found these market-driven work practices to be stressful, particularly as teams worked in an extremely competitive way to finish projects before deadlines.

However, the stress of work–life balances seemed to fall disproportionately on female rather than male software staff. For example, around 82 per cent of women felt that domestic responsibilities were affected by longer working hours, whereas only 69 per cent of men felt the same. Respondents reported that, when someone was sick at home, it was women who typically took time off from work. Similarly, many women discontinued software work on becoming pregnant or having children as no support was provided, and they were unable to undertake roles both in the home and the workplace without such support.

Some mothers who gave up careers in software development had continued to try to make use of their skills by taking up more flexible jobs such as teaching in computer training institutes. For those women who continued (or began) working in software after having children, familial support was the major factor enabling continuity of work.

Source: S. Arun and T.Arun (2002, p.4).

2004, the total vacancies for IT positions are predicted to reach 2 million, but the demand and supply for IT workers will be unevenly distributed. Worldwide the skills gap will reach 28 per cent of demand by 2004, with the highest shortage in Latin America (63 per cent), Europe/Middle East and Africa (40 per cent), followed by North America (26.5 per cent) and Asia/Pacific (12 per cent). In absolute figures, IDC estimates the IT labour shortage to be highest in Europe/Middle East/Africa with 1 million, followed by Latin America (425,000), Asia/Pacific (300,000) and North America (235,000). According to IDC, the demand for IT skills will grow highest in the Asia/Pacific region, but as the supply also grows at higher rates, the skills gap will not be as dramatic as in other regions. In fact, the supply of IT skills is the highest worldwide in the Asian region, and is expected to total 2.2 million professionals by 2004 (up from 590,000 in 2000). Asia/Pacific would account for 47 per cent of the global supply of IT professionals in 2004. Brazil, the United States and Germany are expected to be the countries needing most IT professionals by 2004 (705,000), followed by the United Kingdom (175,733), China (136,765) and Mexico (118,848).

Although many technology workers were laid off in the United States after the dotcom crisis of 2000, the demand for IT workers has increased again in 2002:

according to a survey by the Information Technology Association of America (ITAA), there may be as many as 600,000 unfilled IT jobs in 2002.[16]

The implications of this prevailing trend in demand for IT skills outstripping their supply are promising for women. For one, women's labour force participation rates have been increasing in developing countries. In East Asia, North-East Asia and South-East Asia, women constitute more than two fifths of the labour force; in China, women's labour force participation is nearly three fourths (Brisco, 2002). Secondly, the shortage of skills in developed countries such as the United States and even in Europe has led many corporate executives to outsource IT work to developing countries, thus offering many digital opportunities for women's employment in the ICT sector (see previous section). Finally, the Internet has the potential to empower women business owners in Asia and other developing regions and could therefore ensure a level playing field for women and men.

2. Activities and skills required by the ICT corporate sector

In order to enhance women's participation in e-commerce at all levels, it is important to identify areas of expertise needed by the corporate sector for e-com-

merce in developing countries. This is particularly so as ICT-related trade in services has led to a dichotomy between ICT-focused and business-focused activities.

For the purpose of monitoring and facilitating women's entry into key occupations, it could useful to consider the various core activities for conducting e-commerce. IDC divides ICT services industries into two categories (see annex 1 for complete list of categories of the ICT services industry): (a) IT activities primarily targeting information systems and technology-enabled processes; and (b) business activities primarily targeting business processes along the value chain (e.g. primary activities such as manufacturing, marketing and sales and services; and support activities such as procurement and logistics, human resource management, and research and development).

The potential implications for women of this distinction between information technology activities and business activities could be enormous. Many business activities and corporate functions, especially back-office support operations such as typing, scheduling, filing or communications, are now becoming ICT-based and it is women in many, if not all, corporate entities who carry out these functions. Thus, women should learn these required ICT skills to prevent bottlenecks from occurring in the corporate infrastructure. In addition, this framework could be used for benchmarking women's progress, or the lack of it, in key areas of activities related to e-commerce.

3. Few women in high-skilled jobs

Given the scenario of a prevailing IT skills shortage and the increasing trend towards business activities and corporate functions becoming IT-based, another manifestation of the gender digital divide is the lack of adequate representation of women in the higher echelons of IT-related jobs. Few women are actual producers of information technology as Internet content providers, web designers, software programmers or computer troubleshooters (Hafkin and Taggart, 2001).

In the United States, females comprise a minority in mid to upper-level IT-related jobs, notwithstanding the fact that 50 per cent of Internet users in the country are women (Taggart and O'Gara, 2000). For instance, only 9 per cent of engineers, 28.5 per cent of computer programmers and 26.9 per cent of systems analysts in the United States are females. Women, however, reportedly constitute the majority (85 per

cent) of data entry workers. Moreover, there are gender disparities in the salaries between men and women in IT in the United States. According to Taggart and O'Gara, women in IT career jobs earn 67 per cent of what their male counterparts earn. It is to be expected that this disparity would be much wider in developing countries. The authors cite the profile of women trainees in an ICT school in Brazil, which shows more enrolment in word processing courses that would prepare these women for support and secretarial positions. In contrast, the networking or programming courses are predominantly attended by their male counterparts, who would thus obviously be equipped for higher-paying jobs and more remunerative IT career paths. The authors suggest therefore that trends in access to and use of IT are not sufficient indicators for the equitable participation of women in the information society. Instead, what should be looked at is how women use the Internet and what skills they are equipped with, as these would determine their role in and contribution to the digital economy.

In order to meet the impending skill shortages in critical areas, women must therefore be prepared for careers at all levels of the ICT sector, from data entry to software design, network management and IT entrepreneurship. In considering how ICTs and the Internet could benefit women economically and socially, policy-makers should think beyond women selling their crafts via the web, to women selling their skills as website designers, network managers or IT services consultants.

4. Gender differentiation in IT education and training

Women in developing countries do not yet find it easy to obtain suitable jobs or income-generating work in the fields of network management, web design or software development, because they are not equipped with the necessary skills. The explanation does not necessarily lie in discrimination against women in centres of education and training in developing countries. In developing as well as in developed countries, there are difficulties in attracting and retaining women in ICT training and education. An example used by Taggart and O'Gara (2000) from the experience of Cisco's international Networking Academy Program (CNAP) provides some answers to why women's participation in IT training has been minimal (box 10).

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Box 10

Women's participation in IT education and training

Cisco Networking Academy Program (CNAP) is an international training program that teaches students to design, build, and maintain computer networks. The CNAP curriculum is offered in over 70 countries and taught through web-based modules facilitated by on-site instructors in secondary schools, technical colleges, universities, and non-governmental organizations. Minimum education requirements are an eighth grade reading and math level. Recent data indicate that overall, 22% of CNAP students in emerging market countries are female. As a result of Cisco's interest in expanding the number of women in CNAP, Cisco Systems is supporting the Academy for Educational Development to conduct research on female participation in the CNAP in order to develop strategies for increasing female enrolment and completion.

Students and instructors in Cisco's program voice a common message that once women are in the programme, they excel, and in fact perform better than male students.

Source: Taggart and O'Gara (2000).

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It is not a foregone conclusion that the experiences of developed countries are going to be replicated in the developing ones, where the choice of career and employment opportunities for women is more limited. The IT enrolment gender profiles for the United Kingdom and the Philippines shown in charts 7 and 8 provide a number of interesting insights.

Female enrolment in IT courses is lower in both countries. However, in the Philippines, where employment and career prospects are more limited than in the United Kingdom, opportunities for overseas work depict a higher proportion of women graduating in ICT. While women lag behind their male counterparts in ICT enrolment, they are ahead of males in terms of
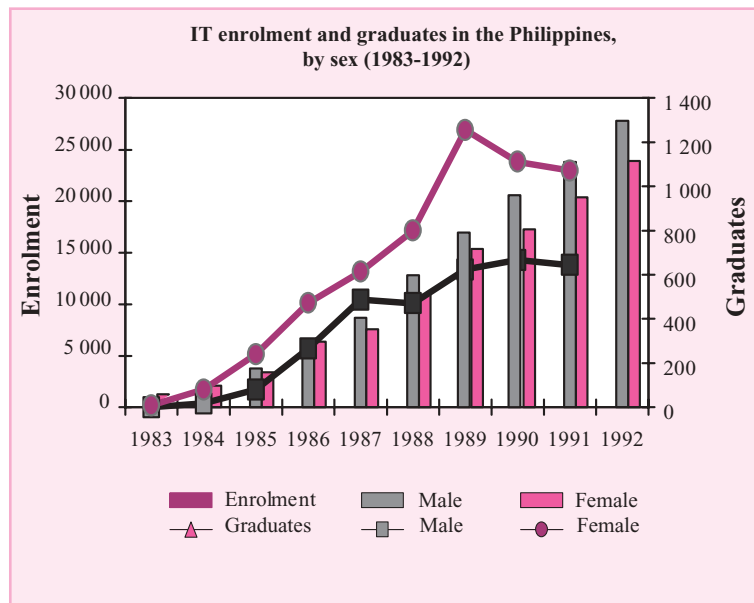
Chart 7
Gender profile of enrolment in IT courses in the United Kingdom, 1994/95-1998/99
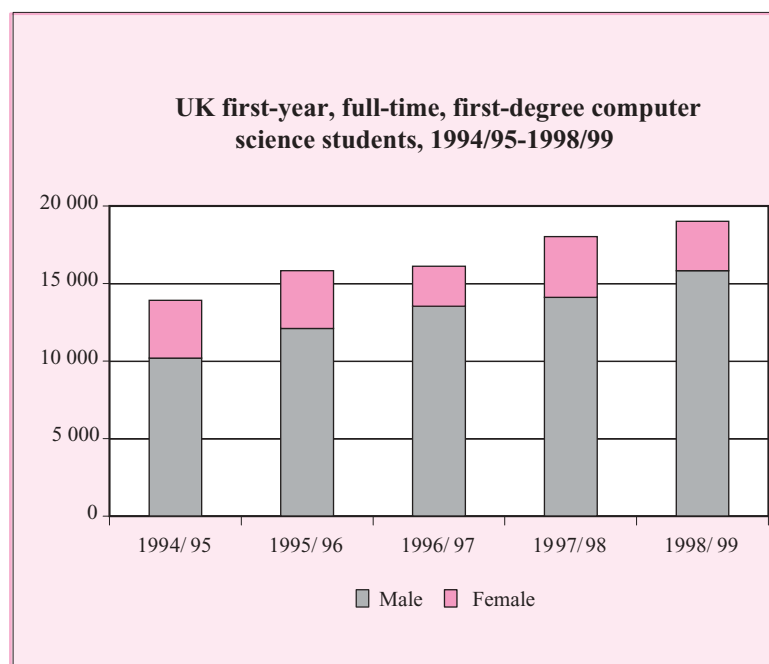
Source: Connor et al. (2001).

Chart 8

Gender profile of IT enrolment and graduates in the Philippines, 1983-1992

**IT enrolment and graduates in the Philippines,
by sex (1983-1992)**

Source of raw data: Commission on Higher Education, Department of Education, Culture and Sports, Philippines.

the number of computer graduates. The large gap between enrolment and graduation figures in the Philippines, for men as well as for women, is accounted for by the fact that students often find it difficult to continue with training because of its high cost, which is privately borne. In the United Kingdom, as cited by Connor et al. (2001), there is even a declining trend in the percentage of female computer science graduates – 21 per cent in 1998/1999 as compared with 22 per cent in 1994-1997 (Millar and Jagger, 2001).

To increase the number of women in the IT education and training tracks, computers and the Internet should be integrated early on into school curricula to encourage girls to pursue science and mathematics courses. Greater awareness of how ICT skills could lead to a wide range of careers for women will attract them into the ICT field. A study conducted by the Carnegie Mellon University in the United States indicates that early exposure to science and technology could change women's perceptions of IT programmes (box 11).

Box 11

Carnegie Mellon University on attracting women into IT programs

Research by the Carnegie Mellon University (CMU) in the U.S. indicates that adapting science and technology curricula may change women's perceptions of IT programs and consequently, attract more girls and women to this field. For example, CMU's research showed that female computer-science students were more interested than male students in the "context" of computing. 44% of women interviewed, vs. 9% of the men students, link their interest in computers to other arenas. They emphasized the importance of "doing something" with their skills and "connecting computer science to 'real-world problems.' "

Other U.S.-based research has similar findings, drawing the conclusion that "insuring science and technology are considered in their social context…may be the most important change that can be made in science teaching for all people, both male and female." As a result of their research, CMU has adapted their curriculum by, among other strategies, integrating non-science disciplines into their computer-science program and offering a computer science course in which students work with community non-profits to apply their skills to community issues. After 4 years, the number of females enrolled in the computer-science program at CMU increased from 8% in 1995 to 37% in 1999. This idea is not new. Experiential education theory has familiarized us with the notion that learners may respond more favorably to a subject when it is taught with practical application to the 'real world' context. Yet, when applied to IT training, these findings offer some new strategies for expanding the number of girls and young women pursuing science and technology education and careers.

Source: Taggart and O'Gara (2000).

D. Other factors affecting women in the digital economy

Apart from skills and training, there are a number of other constraints that prevent women from fully engaging in the opportunities created by the digital economy. These obstructing factors, described below, are essentially access to Internet technologies, availability of credit or financing, the language of the Internet and other social and cultural barriers.

1. Access to Internet technologies

Many researchers and policy makers have expressed concern that inequality in access to Internet technology will increase the existing polarity between countries as well as between groups within a country. In such discussions on the digital divide, gender issues have received attention. The ITU (1999) gave a timely warning on impending cyber sex discrimination, since it viewed cyberspace as a predominantly male area where the technical and managerial roles are assumed by men. Its World Telecommunication Development Report 2002 (WTDR) portrays a different and more optimistic future. The spread of very small aperture terminal (VSAT) technology and mobile telephony has considerably narrowed the teledensity gap between the developed and developing world.[17] Also, the third-generation mobile telephone promises to bring networking technology in a cost-effective way to women who are not privileged, even in the rural areas.

Access to infrastructure alone, in the absence of access to market and skills, will not enhance participation in e-commerce.[18] Human resource development issues that focus on technical and marketing skills should perhaps feature as prominently as infrastructure in a policy framework. The cost of infrastructure, however, is likely to remain a major issue for both women and men, particularly in the poorer countries. In Bangladesh, for example, the cost of a computer equals nearly two years' salary for a professional person, and a modem costs more than a cow (Mitter, 2001).

The collective use of telephone and Internet facilities to some extent helps, or might help, traditionally disadvantaged groups, such as women, to overcome the challenges of infrastructure constraints. The use of cyberkiosks and Internet cafes are examples of collective use facilities that come from the market-oriented private sector. Telecentres present possibilities of collective use with subsidies and support from donor agencies and the public sector.

Concerns about bandwidth are often overlooked in the discussion of collective use. To conduct e-commerce in a sustainable and efficient way, it is not enough to have connectivity – the right amount of bandwidth is also needed. Developing countries generally lag behind the developed ones in a dramatic way in terms of access to bandwidth. According to the ITU (2002), there is an uneven distribution of bandwidths among countries – for example, the 400,000 citizens of Luxembourg between them have more international Internet bandwidth than Africa's 760 million citizens. Given their position in the economy and in society in poorer parts of the world, it is likely that women more than men will have problems in having access to adequate bandwidth necessary for conducting e-commerce. This is an issue that policy makers should be concerned with.

The gender digital divide

Disaggregation of Internet usage by gender is difficult to obtain, especially from developing countries, and if available the data are not very reliable and comparable. However, even if the figures are not reliable, the numbers of women Internet users are very likely to be small in developing countries, considering that statistics that are not even disaggregated by gender show already a very small or insignificant proportion of Internet access for the entire population. Some preliminary indicators provided by Hafkin and Taggart (2001) show that of the total number of Internet users in 2000, women accounted for 22 per cent in Asia, 38 per cent in Latin America and 6 per cent in the Middle East. No figures were given for the African region as a whole. These data were based on marketing studies compiled by e-commerce consulting firms (table 15).

What is borne out by these statistics is the apparent absence of a correlation between female Internet users and female GDP[19], female literacy, or the percentage of female technical and professional employment, as well as of gender empowerment as represented by the Gender Development Index (GDI).[20] As explained by the authors of the study, these figures support their hypothesis that women Internet users in developing countries come mainly from the educated, urban elite, and are hence not representative of women in the entire country.

Home access to the Internet in many developing countries is a rare phenomenon. The woman lawyer referred to in box 12 is an example of women professionals in developing countries who encounter diffi-

Table 15

Women's Internet usage in selected countries

Country	Women as % of Internet users, 2000	Total women Internet users in 000s	Total number Internet users in 000s	Internet users as % of total population	Population in 000s	Female prof. & tech. workers as % of total	Female literacy rates	Female GDP per capita ($)	GDI rank 1/174
United States	51.1	83 479	170 280	60	283 800	53.1	99	23 540	3
Philippines	51.0	76.5	150	0.6	77 726	65.1	94.3	2 510	65
South Africa	51.0	645.6	1 266	4.2	42 835	46.7	83.2	4 637	84
Brazil	43.0	1 075	2 500	2.1	169 807	63.3	83.9	3 813	67
Croatia	42.0	63	150	4.3	4 672	n.a.	96.4	3 557	50
Mexico	42.0	567	1 350	2.5	98 553	45.2	87.9	4 594	48
Estonia	38.0	57	150	14.1	1 421	66.8	99	4 236	49
Russian Federation	38.0	4 560	12 000	1.8	146 861	n.a.	98.8	3 503	61
Zambia	37.5	1.13	3	0.2	9 461	31.9	67.5	753	125
Uganda	31.5	4.73	15	0.1	22 167	n.a.	35	944	131
China	30.4	6 840	22 500	0.7	1 265 530	45.1	74.5	2 485	79
India	23.0	115	500	0.2	983 377	20.5	39.4	902	112
Poland	18.7	295.6	1 581	5.4	38 607	61.2	99	5 061	40
Ethiopia	13.9	0.83	6	0.1	58 390	n.a.	29.2	349	172
Slovakia	12.0	60	500	13.0	5 393	59.7	99	6 366	39
Czech Rep.	12.0	48	400	6.8	10 286	54.1	99	7 952	34
Senegal	12.0	0.90	7.5	0.3	9 723	n.a.	24.8	1 253	127
Lithuania	10.0	7	70	2.9	3 600	67.5	99	3 323	55
Jordan	6.0	3.7	60.8	1.8	4 435	n.a.	81.8	1 429	n.a.

Source: Hafkin and Taggart (2001).

culties in accessing the Internet not because they do not own computers but simply because they do not even have telephone lines, which is a basic Internet infrastructure. Unlikely to have computers at home, most women in developing countries also cannot afford to use public access sites. User fees charged for Internet access at public venues may not be affordable for women, who are generally less able than men to pay fees (averaging $1 to $3 an hour) (Hafkin and Taggart; 2001).

Box 12

Accounts of difficulties in accessing basic Internet infrascruture

A woman lawyer in Uganda recognises the importance of international Internet connectivity for information, support and advocacy, but has not been able to afford or obtain a separate phone line. To use e-mail, she drives 20 kilometers to the University library, presents a copy of the information to be sent either in manuscript or diskette, and pays one US dollar per page to send a message and 50 US cents per page to receive a message. She has to wait two days to pick up replies, but most e-mail she sends never arrive at their destinations, because the addresses are keyed in wrongly by the library personnel.

Source: Huyer (1997).

When women do have access in developing countries, it is usually in the workplace. This creates a dichotomy between the use of ICT by women as tools of production (e.g. routine office work, data entry, programming) and tools of communication (e.g. creation and exchange of information). As to the latter, women working for non-governmental organizations have used the Internet mainly for political advocacy to protect women's rights and women's causes ranging from domestic violence issues to sexual slavery.

2. Availability of finance

Apart from access to infrastructure and education (skills), lack of capital is the third key obstacle facing women (especially women entrepreneurs) wishing to engage in e-commerce and e-business. To start up ICT-enabled businesses or to employ ICT tools to enhance existing businesses, women will need capital from special financial institutions in developing countries that lend specifically to women entrepreneurs who have no collateral, and who work mostly in the informal sector. The most likely source of the necessary financial capital could be microcredit schemes that specifically target women because of high take-up and repayment experiences and social dividends reaped from lending to them (Hafkin and Taggart, 2001). In this sense, ICT-enabled businesses are no different from other traditional microenterprises in which women in developing countries are engaged. They both involve light-based manufacturing, trade, or service activities; employ about five people or less, mostly family members; have low barriers to market entry; are home-based; and require less professional experience and knowledge than those of their male partners. The only differentiating factor is the use of new technologies.

The microfinance or microcredit programmes are aimed at empowering women beyond just the setting up or expansion of microenterprises. Specifically, microcredit schemes increase women's income levels and their economic independence, enhance their autonomy over household decisions about expenditures, promote positive attitudes to women's social and political roles in communities, and provide them with information and support networks to protect their individual and collective interests at the local and macro levels.

The outreach of the world's largest microcredit schemes shows a varied performance ranging from a 100 per cent outreach in countries such as India, Malaysia, Bangladesh and Mali to less than 50 per cent

in Uganda, Nigeria, Ethiopia, Nepal and France (see annex 2 for a detailed description of the 34 largest microfinance schemes). These schemes could be useful entry points for policy makers in a programme aimed at facilitating women's opportunities in ICT-related business.

In the case of ICT-enabled businesses, the Grameen Phone Project in Bangladesh described in section B stands out as a best practice model combining lending to women's microenterprises with literacy training and skills development. As described by Hafkin and Taggart (2001), among the two million borrowers of the Grameen Bank, who received wireless phones as an in-kind loan to village phone operators, 75 per cent are women. The operators resell the mobile phone service to fellow villagers, earning an average annual income of $300 as against the national average per capita income of $286. About 90 per cent of the women operators are married and have no formal education. The phone business can be managed simultaneously with another business or while doing household chores. The major advantages of this type of ICT-enabled enterprise are the minimal educational requirements (just some basic mechanical aptitude), and the small capital needed, enough to be supported by microcredit schemes. There are positive externalities also in accelerating rural development where telecommunication density is sparse.

Another successful example of ICT-enabling business with a microfinancing component is the use of smart cards by Indian women milk collectors in Rajasthan. The smart cards were used to record the quality, fat content and sales of milk to distributors and served as their bankbook, thereby empowering them to make spending decisions and increasing their profits while eliminating the middlemen (called *dhudhwala*).[21]

3. Language of the Internet

The dominance of English as the language of the Internet represents a serious problem for the majority of the world's population, which does not speak English. Women without access to formal schooling that allows them to learn foreign languages are again marginalized, but so are men in countries or regions where English is not "the" language, such as Latin America, the Middle East, French-speaking Africa and Eastern Europe. According to Hafkin and Taggart (2001), language was among the main barriers to Internet usage that women cited in their response to the Association for Progressive Communications (APC) Women's Networking Survey in 1996. Even where women do

have equal access to formal schooling, they may need to receive additional training in foreign language skills, for which time and resources will be scarce.

Hafkin and Taggart (2001) also noted that "even users with basic proficiency in English experience discomfort that discourages Internet use when using other than their native language". They cited a technical training programme conducted in Mexico, which discovered that users with a low English proficiency level were reluctant to access online help centres simply because it was in English.

While the predominance of English is a threat to the social inclusion of non-English-speaking women in the digital economy, the increasing trend towards multilingual content provides a digital opportunity in terms of language translation in software development and in web design in native languages. As with other

remote services (see section B.2), this could work well for women wishing to combine household responsibilities with income-earning activities.

The other implication of the predominance of English as the Internet language is the close correlation of outsourcing and English proficiency. Earlier in this chapter, it was indicated that outsourcing trends will be on the increase (see section B). Since the top two outsourcing markets – the United States and the United Kingdom[22] – are both English-speaking, those developing countries that would want to tap those markets would have to learn English. English proficiency has been mentioned by outsourcing companies as one of the key requirements (see box 13). This gives rise to some policy implications for improving the schooling and literacy of women where a second language – English – should be learned.

Box 13

Opportunities in offshore outsourcing and English proficiency

American companies unable to find, hire, and retain skilled IT workers at home are finding a vast pool of highly educated technology savvy, English-speaking workers available overseas. "These companies are sending IT projects offshore to compensate for the limited pool of talent available in the United States", according to Cynthia Doyle, research manager for IDC's IT and Offshore Outsourcing Strategies Programme.

IDC believes India is best positioned to capture a large part of the offshore outsourcing opportunity. However, other regions have potential to develop as major sources of offshore outsourcing, including Canada, Mexico, the Caribbean, South Africa, Israel, Ireland, and Eastern Europe.

"To be a successful provider of outsourcing services, a region must demonstrate fluency in English, a vast pool of IT talent, a solid infrastructure, and experience doing business with Western companies".

Source: IDC, "Offshore outsourcers are getting involved in increasingly complex IT projects", downloadable from ww.idc.com/ getdoc.jhtml?containerId=pr50223

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4.   Social and cultural factors

Many of the previously discussed factors affecting women's participation in the information economy are directly linked to the roles and positions of women in society and the family. In low-income families, parents tend to give priority to the education of boys rather than girls.[23] Also, women often have less control over family income (in particular if men are the main income earners), which makes it more difficult for them to pursue (fee-based) training in IT-related fields or spend family income on ICT access and use. Prevailing gender stereotypes discourage girls from pursuing science, technology or engineering careers in

many developing countries, especially in Africa, where the numbers of female students in these fields are particularly low (UNESCO, 1999).

In some cultures, women's presence in public is restricted. Women may not be able to travel to undergo training or attend courses by male teachers, while at the same time few female teachers in the IT and engineering fields may be available. Also, women may not be allowed to use public Internet access centres or telecentres and hence will depend more heavily on home-based access. Lack of interaction with the public also restricts women's opportunities to practise foreign language skills. Even in societies where women's presence in public is not restricted, the cur-

rent predominance of male customers in cybercafes in many countries discourages women from using these public access places (Hafkin and Taggart, 2001).

Time is another constraint particularly felt by women, given that they assume most household and childcare responsibilities, often also caring for elderly family members. While home-based Internet access allows women to save time in their business activities, generally they have less free time to spend using the technologies (at home, at work or in public access centres) or to attend IT, language or other e-business-relevant training.

E. Conclusions and policy recommendations

This chapter has attempted to shed light on the way e-commerce and the digital economy impact on women and men in developing countries. Using examples from the countries concerned, it has described the opportunities offered to women as well as the constraints they face in taking full advantage of the potential of ICT and e-commerce. In this process, policy makers will have to play a key role in creating an environment favourable to the participation of women in the digital economy. The following draws some conclusions and outlines areas of possible policy intervention. Annex 3 lists a set of policy options identified by an UNCTAD intergovernmental expert meeting on gender.

The review of the literature has shown that with regard to women's taking advantage of e-commerce and ICT-enabled work, the implications for policy point to access to education and schooling, Internet infrastructure and technologies, financial capital, and the promotion of e-business and IT-enabled employment opportunities. Improving women's access to Internet technologies requires extensive infrastructure building of basic telecommunications (including wireless and satellite) in rural and peri-urban areas, which are currently underserved in many developing countries. This should involve common facilities such as telecentres and phone shops that offer public Internet services and are located in venues which women frequent, such as markets, churches, health clinics, schools and post offices. Microcredit programmes should target the poorest, marginalized women, improving delivery mechanisms that involve men so as to increase their perception of the intervention as supplementing family income instead of being a threat to status. Women should be allowed greater control over their incomes

and be given greater powers of decision about family expenditures. A perhaps more radical implication would be the empowerment of women by allowing them titles to conjugal assets so that they could eventually be able to qualify for financing from the formal financial sector.

In the area of job creation, policy makers need to promote IT-enabled employment such as teleworking. The discussions in this chapter have shown that in developing countries institution-based teleworking generally appears to be a more attractive option than home-based teleworking, both for working mothers with young children and for management. For relatively highly skilled women, for example in software programming and the media, home-based teleworking, at certain stages of their lives, could provide a solution to problems of combining childcare responsibilities with those of ICT-related professions. But even for these women, policy makers need to ensure better provision of childcare facilities so that they do not settle for home-based and/or less challenging occupations because there is little choice. In other words, a policy framework needs to take into account the complexities of women's aspirations and life cycles with regard to enhancing their participation in all segments of e-commerce.

It is crucial to highlight the role and importance of the informal sector in the developing countries, given that the majority of the workforce work either as employees in non-contractual jobs or as miniscule or small-scale entrepreneurs. Again, women make up the largest share of workers in the informal sector in many developing countries. Women in small-scale business face additional hurdles as regards making use of ICT either for marketing or for advertising because of their limited access to market information, finance, assets and infrastructure. This is where the real challenge lies for policy makers in their efforts to bridge the (gender) digital divide and include the poorest segments of the population.

Need for women in ICT decision-making

Women should participate more in ICT policy-making in order to ensure that gender issues are being addressed. However, there is a lack of women in decision-making structures in information technology policy-making and governance in developing countries. Hafkin and Taggart (2001) found that only 5.5 per cent of senior government officials responsible for information and communication technologies in developing countries were women, although these few

were in top positions, such as ministers of communication or telecommunication (in Mali, South Africa and Colombia) and deputy ministers of communication (in Angola, Belarus, the Czech Republic, Ghana, Kyrgyzstan and the United Republic of Tanzania). These women could have an influence on the course of information and technology development in their countries and in regional and global forums. Hafkin and Taggart also looked at the number of women in ITU Study Groups in major areas of communications and technology development; such groups can influence the direction of the development of information and communication infrastructure and standards in developing countries. Out of 51 persons, there were only two women, and no women from Africa, Asia or Latin America. Similarly, at the Internet Corporation for Assigned Names and Numbers (ICANN), there are no women from the developing world among the 19 directors. Policies should thus be geared towards including more women in ICT decision- making positions at the highest levels.

Finally, the question of gender in relation to e-commerce has to be placed among the wider issues of development and growth. As we have seen, the current share of developing countries in both B2B and B2C is minute. Asia is the leading region in the developing world in e-commerce, followed by Latin America. The share of African and other developing countries is virtually nil. Even within Asia, these are concentrated in a handful of countries such as India, Malaysia, China and the Philippines. Therefore, the question of gender should not be addressed solely from the distributive point of view at this stage. Rather, it has to be addressed as a strategy for harnessing women's potential skills along with men's in endowing countries with comparative advantages for participating in e-commerce and e-business, nationally and globally.

1. Policy recommendations for enhancing skills and training

Education is by far the most important policy intervention for improving the ability of girls and women in developing countries to participate in the information society. Apart from ensuring equal access for girls and boys to primary and secondary schooling, women also need to get better access to business and technical education, especially at tertiary levels. This could be addressed by both the public and private sectors in the following manner:

- A key strategy would be to focus attention on generating demand for IT education from women themselves through awareness programmes. Exposing girls to computers and the Internet and to science and mathematics disciplines at early stages should be initiated by Governments, particularly education ministries, before gender stereotypes start to influence female attitudes.

- A second key element would entail follow-up training on ICT-related courses for women already in the workforce. It may be of benefit for companies to sponsor women in ICT training programmes, since women are potential sources of scarce skills for occupations and functions that are now being enabled by computers and the Internet. For women in the informal sector, Governments or the private sector should build IT training institutes which charge affordable tuition fees and are flexible with respect to women's time constraints.

- A third element would be ensuring that women acquire the right IT skills. Training must go beyond teaching women how to use a word processor or how to enter data, towards actual IT creation and production such as hardware and software development, web authoring and design, network management and computer troubleshooting. Women will also need business and entrepreneurial skills in order to apply these IT skills: if they are to use ICT in managing their small businesses, they need to be trained in how to develop business plans, conduct market surveys, and search for information on funding sources and the like. Women engaged in remote processing and distant work need to receive appropriate training in order to stay in employment and business as and when skill requirements alter in response to changes in technologies. And women, particularly young women, need to be provided with opportunities to learn foreign languages (especially English).

2. Other policies to enhance the participation of women in the digital economy

- Providing common access facilities, such as community centres, that reduce the commuting time of professional and business women; and public Internet services in venues that women frequent, such as markets, churches, health clinics, schools and post offices;

- Creating an appropriate environment where new modes of working – such as teleworking – could enhance women's participation in e-commerce as employees or freelances, by improving their access to Internet technologies in rural and peri-urban areas;

- Providing facilities for childcare so that women can continue working in the IT-enabled sector;

- Raising awareness in the corporate sector of the advantages of teleworking for female employees as well as for companies;

- Developing and publicizing the availability of a critical mass of multilingual and computer-literate female workforce to attract customer care services work from national as well as transnational companies.

- Supporting the establishment of telecentres as incubators and facilitators of small business in information and communication services;

- Helping to develop multilingual websites in order to make it possible for women, with less access to education and English literacy, to surf the Internet for market and business information that includes legal procedures and regulatory frameworks;

- Highlighting and, when possible, rectifying legal and cultural practices that constitute barriers to women's entry into the e-economy;

- Promoting business and entrepreneurial prospects for women in the e-economy by offering venture capital and micro finance to women entrepreneurs to set up small businesses in ICT-related and remote processing services;

- Evaluating microcredit programmes for bringing the poorest, marginalized women into the orbit of e-commerce;

- Strengthening the advocacy power of NGOs that lobby for women to have greater control over their incomes and over decisions on family budgets and expenditures.

Notes

1 Many other United Nations bodies have started to mainstream gender in their work programmes on ICT and development. In particular, the UN Division for the Advancement of Women (DAW), in collaboration with the ITU and the UN ICT Task Force, is organizing an Expert Group Meeting on the role of ICT for the advancement and empowerment of women, to be held in the Republic of Korea in November 2002. The UN Commission on the Status of Women (CSW) will consider the same subject at its 47th session in March 2003. The outcome of both meetings will contribute to the WSIS.

2 See www.worldbank.org/gender/digitaldivide/interventionsasia.htm

3 Ibid.

4 See www.tortasperu.com

5 See www.ethiogift.com

6 See www.elsouk.com

7 www.idc.com

8 In India the average annual salary of a computer programmer is less than one sixth of that of a programmer in the United States. In the Philippines it is one seventh. The average annual salary of a medical transcription secretary is $1,200 in India compared with $25,000 per annum in the United States. See Mitter and Sen (2000, pp. 2263-2268).

9 Communique India (2002); www4.gartner.com; see also chapter 9 (on e-services).

10 www.nasscom.org

11 Interview by Swasti Mitter with Sushanto Sen, Deputy Director of CII, on 8 March 2002.

12 Back-office operations are the offsite delivery of a range of non-core service functions, including routine administration tasks, customer service and technical support. They involve the use of an outsourcing base in another country (Communique India, 2002).

13 www.outsourcing.com

14 Although the concept has received most attention in developed countries, the United Nations University Institute for New Technologies (UNU-INTECH), in Maastricht, carried out two research projects in India and Malaysia, exploring the potential and spread of teleworking in developing countries. See Mitter (2000) and Ng (2001).

15 "Voice recognition aims to lower call-center costs", 22 October 2001, www.informationweek.com/story/ IWK20011018S0084; "Smarter voice recognition technology will cut call center costs", 28 May 2002, Speech Technology Magazine, www.speechtechmag.com/cgi-bin/udt/ im.display.printable?client.id= speechtechmag-news&story.id=778 - 4k - I ; "Coming soon: web sites with a voice", November 2000, www.internetwk.com/story/ INW20001109S0005.

16 "Study sees IT worker shortage in 2002", 6 May 2002, www.news.com.com/2100-1017-899730.html

17 In 1991 total telephone penetration (fixed-line plus mobile telephones) stood at 49.0 in developed nations, 3.3 in emerging nations and 0.3 in the least developed countries (LDCs). A decade later, the corresponding levels were 121.1, 18.7 and 1.1. The ratio between developed and emerging nations dropped by more than half from 15.1 to 6.1, while the gap between developed and LDCs dropped from 171.1 to 112.1. Emerging nations have done particularly well and, if anything, there is a growing gap between them and the LDCs. The gap between emerging nations and LDCs rose from 12.1 to 17.1 (ITU, 2002, p. 17).

18 The reason for women or men not using the Internet is, according to the WTDR, not so much related to cost as to lack of relevance. A survey undertaken by Ipsos-Reid and incorporated in the WTDR indicates that only 12 per cent of respondents gave "cost" as the reason for not using the Internet, as compared with 40 per cent who felt there was no need to use it (p. 26). Since the survey does not clarify the characteristics and geographical coverage of the sample, it is difficult to generalize from the findings.

19 Based on the UNDP Human Development Indicators, female GDP is roughly derived on the basis of the ratio of the female non-agricultural wage to the male non-agricultural wage, the female and male shares of the economically active population, total female and male population, and GDP per capita (PPP $). For further details see hdr.undp.org.

20 The GDI, developed by UNDP, simply adjusts the Human Development Index to take account of inequalities between men and women in life expectancy, literacy and income. Fore a definition, see UNDP Human Development Reports.

21 World Bank (2002).

22 United States-based companies alone are projected to increase outsourcing spending threefold to over $17.6 billion in 2005 from under $5.5 billion in 2000. In Europe, the United Kingdom is becoming the leading outsourcing market, capturing 22 out of the 34 mega contracts (worth over $1 billion) that went to the region.

23 Girls comprise two thirds of school-age children in the developing world without access to basic education (Hafkin and Taggart, 2001, p. 27).

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ANNEX 1

Table 16

IDC's services industry IT activity groupings

Planning	Implementation	Operations	Maintenance and support	IT Education and training
Process improvement	Site preparation	Asset management	Telephone support	IT/technical skills training
Operations assessment	Project management	Procurement	Parts support	Desktop skills training
Benchmarking	Test and debug	Administrative and operations	Remote network monitoring	Professional certification
Needs assessment	System configuration	Media duplication and replication	Remote diagnostics	Learning augmentation
Strategy	Installation	Systems management	Electronic support	
Capacity planning	Software re-engineering	Performance tuning	Software maintenance	
Change management	Custom software development	Network management	On-site maintenance	
Maintenance planning	Packaged software customization	Back-up and archiving	On-site software support	
Design	Application interfacing and integration	Business recovery	Preventive maintenance	
Supplier analysis	Relocation services			
	Systems migration			
	Documentation			
	User experience design and analysis			

Source: IDC (2001), www.idc.com/getdoc.jhtml?containerId=26051&pageType=PRINTFRIENDLY

Table 17
IDC's services industry business activity groupings

Planning and design	Implementation/deployment	Support	Business skills training	Execution/operations
Strategy	Custom content development	Telephone support	Training delivery	Asset management
Process improvement	Rules specifications	Compliance	Professional certification	Procurement management
Process re-engineering	Project management	Electronic support	Learning augmentation services	Pick and pack
Operations assessment	Quality assurance/testing		Learning administration	Special handling
Benchmarking	Environmental assessment			Profiling
Needs assessment	Business documentation			List/database
Change management	Relocation support			Verification
Designer	Site selection and preparation			Lead qualification
Supplier analysis				Lead distribution
Organizational design				Support seminars
Cultural assessment				Marketing campaign analysis
Global brand positioning				Marketing campaign reporting
Global trade assessment				Telesales
Skills assessment				Prospecting
Legal and regulatory assessment				Order processing

Planning and design	Implementation/deployment	Support	Business skills training	Execution/operations
Capacity planning				Invoicing
				Shipping
				Inventory management
				Contract management
				Shipment management
				Employee performance management
				Credit refunds
				Time and attendance tracking
				Employee records/data management
				Cheque processing
				Tax and regulatory filing
				Payment processing
				Records storage and management
				Benefits open enrolment
				Corporate communications
				Benefit administration
				Job posting
				Candidate identification
				Skills and behavioural assessment
				Candidate interviews
				Background checks
				Candidate selection and negotiation
				Candidate hiring
				Recruiting process reporting
				Risk management and site recovery
				Equipment maintenance
				Facilities management
				Administration and operations
				Media duplication and distribution

Source: IDC (2001), www.idc.com/getdoc,jhtml?containerId=26051&pageType=PRINTFRIENDLY

ANNEX II

Table 18

Women reached by 34 largest microfinance schemes

Institution	Total number of poorest borrowers reported 1998	Total number of poorest women reported 1998	Percentage poorest women reported 1998	Total number of poorest borrowers 1997	Total number of poorest women 1997	Growth of women borrowers
Grameen Bank, Bangladesh	2 400 000	2 280 000	95	2 270 000	2 156 500	123 500
Association of Asian Confederation of Credit Unions, Thailand	1 699 292	900 625	53	1 425 262	726 883	173 742
BRAC, Bangladesh	1 040 000	1 040 000	100	900 000	900 000	140 000
Association for Social Advancement (ASA), Bangladesh	720 208	669 793	93	571 859	548 985	120 808
Proshika Manobik Unnayan Kendra, Bangladesh	640 000	358 400	56	420 000	231 000	127 400
Caribbean Confederation of Credit Unions	400 000	260 000	65	370 000	222 000	38 000
Agricultural Development Bank, Nepal	218 153	59 992	27.5	200 183	50 045	9 947
Caritas, Bangladesh	207 473	130 708	63	125 250	80 160	50 548
Debit Credit and Savings Institution, Ethiopia	168 954	64 202	38	76 257	29 740	34 462
Crédit Mutuel, France (worldwide)	162 271	19 448	12	106 884	11 757	7 691
Working Women's Forum, India	162 000	162 000	100	148 700	148 700	13 300
Swanirvar Bangladesh	137 490	103 118	75	110 800	80 884	22 234
Country Women's Association of Nigeria	126 000	113 400	90	90 000	81 000	32 400
People's Bank of Nigeria	108 000	70 200	65	92 500	64 750	5 450
Amhara Credit and Saving Institution, Ethiopia	94 004	47 002	50	46 647	23 323	23 679
Fight Against Poverty Organisation, Nigeria	75 000	74 250	99	35 500	35 145	39 105
Kafo Jiginew, Mali	67 871	67 871	100	56 899	56 899	10 972
South East Sadish Krishi Samabay Samittee Ltd., Bangladesh	62 000	55 800	90	45 000	40 500	15 300
FINCA International, United States (worldwide)	61 480	57 791	94	65 000	62 400	(4 609)
Amanah Ikhtiar Malaysia	56 087	56 087	100	55 666	55 666	421
Uganda Cooperative Savings and Credit Union, Ltd.	51 935	13 347	26	52 097	13 024	323
Thengamara Mohila Sabuj Sangha, Bangladesh	45 000	45 000	100	20 542	20 542	24 458
National Bank of Cambodia	40 570	32 450	80	26 160	20 930	11 520
Buro, Tangail, Bangladesh	39 000	37 050	95	32 413	30 792	6 258
Association for Rural Development of Poor Areas in Sichuan, P.R. China	37 800	20 790	55	11 827	9 580	11 210
Sri Lanka Business Development Center	37 500	22 500	60	22 500	13 500	9 000
IRED, Zimbabwe	35 000	28 000	80	30 000	24 000	4 000
Alliance of Philippine Partners in Enterprise Development	31 193	30 257	97	23 017	21 867	8390
Fédération des Caisses Populaires du Burkina Faso	30 806	29 266	95	12 095	12 095	17 171
Heed, Bangladesh	30 630	22 972	75	25 862	18 103	4 869
Microcredito Santa Fe de Guanajuato, Mexico	27 817	24 200	87	11 517	10 596	13 604
ACLEDA, Cambodia	25 964	25 704	99	9 099	8 917	16 787
Nigerian Agricultural and Cooperative Bank	24 780	4 460	18	27 777	3 888	572
Fundación para la Promoción y Desarrollo de la Microempresa (PRODEM), Bolivia	24 000	15 600	65	21 000	14 070	1 530
TOTAL	9 088 278	6 942 283	76	7 538 313	5 828 241	1 114 042

Source: www.gdrc.org/icm/wind/summit.html

ANNEX III

Mainstreaming gender in ICT policy

Policy options identified at the UNCTAD Expert Meeting on Mainstreaming Gender in Order to Promote Opportunities, Geneva, 14-16 November 2001

Expert Meetings are convened by UNCTAD's Commissions in order to provide specialized technical expertise on specific issues within the purview of the relevant commission. Experts are nominated by the Governments of member States, but they participate in the meeting in their personal capacities.

Policy options identified for consideration by the Commission on Enterprise, Business Facilitation and Development

1. Recognizing the public goods nature of knowledge and the Internet, Governments should ensure rapid, equitable and affordable access to the Internet and ICT for women by taking all appropriate measures such as:

    (a) Establishing an appropriate infrastructure (through telecentres, Internet cafes, etc.) in order to facilitate women's access to the Internet;

    (b) Providing computers and telecommunications at affordable prices to low-income families and specifically women entrepreneurs, as demonstrated by countries such as Pakistan;

    (c) Involving local governments (in addition to the national Government) in reaching out to rural communities;

    (d) Creating broad awareness-raising programmes using mass media and targeting rural areas;

    (e) Offering computer and language skills training specifically targeted at women; focusing on distance education at home or community centres; and offering training courses to women in telecentres at low cost;

    (f) Training women in the methods and scope of setting up e-businesses and developing e-commerce;

    (g) Promoting the capacity of women as managers and owners of telecentres;

    (h) Introducing the appropriate language courses in primary schools;

    (i) Providing Internet databases in local languages;

    (j) Creating public – private partnerships to facilitate access via the Internet to foreign markets and potential business partners for women entrepreneurs.

2. They should enhance the number of women in the IT industry by:

    (a) Increasing the enrolment of female students in ICT-related courses through specific promotion campaigns and scholarships;

    (b) Ensuring the participation of women in the design and development of new technologies;

    (c) Ensuring the representation of women in ICT policy making bodies.

3. They should support organizations and grassroots groups involved in assisting women with access to and usage of the Internet and ICT.

Possible work areas for consideration by the international community and UNCTAD

1. The international community and UNCTAD could contribute towards greater participation of women in the digital economy by:

    (a) Mainstreaming gender in their overall work on ICT and e-commerce;

(b) Promoting ways in which ICT and e-commerce can create new economic opportunities for women and thus contribute towards increasing the competitiveness of developing countries;

(c) Identifying gender-specific opportunities of the digital economy through analytical and case-study-based work, including on such issues as: (i) the level of employment provided to women in ICT-related services sectors; (ii) the extent to which these sectors are involved in export; and (iii) the type of employment foreign firms provide in these services sectors, from a gender perspective;

(d) Collaborating with Governments and the private sector to incorporate the findings from their analytical work into policy dialogue and decision-making;

(e) Developing programmes to facilitate women's access to and use of ICT and e-commerce tools, specifically through transfer of technology and competitive scholarships;

(f) Promoting ways to facilitate women's access to information and the use of ICT in local government development, and the establishment of information management systems.

2.　The Commission on Science and Technology for Development should formulate guidelines on increasing the participation of women in IT during the course of its work on its new substantive theme: Technology development and capacity building for competitiveness in a digital economy.

Chapter 4

M-COMMERCE: WIRELESS COMMUNICATIONS OPPORTUNITIES FOR DEVELOPING COUNTRIES

A.   Introduction

This chapter examines m-commerce, a new form of electronic commerce brought about by the rapid growth of wireless communications. The most common definition of m-commerce is the buying and selling of goods and services using wireless handheld devices such as mobile telephones or personal data assistants (PDAs). A broader definition that extends m-commerce to "mobile business" may be more appropriate. This involves business-related communication among individuals and companies where financial transactions do not necessarily occur.

In the last four years, the growth in the number of mobile telephone users worldwide has exceeded the growth in the number of fixed lines, expanding from 50 million to almost one billion in 2002. Today, over 90 per cent of countries have a mobile network, and nearly one in every six of the world's inhabitants has a mobile telephone. Almost 100 countries have more mobile than fixed-line telephone subscribers and this will become a global phenomenon in the early part of 2002.[1] The introduction of wireless communications has not only expanded telephony in many developing countries, but also introduced wireless data services which are essential for conducting m-commerce. For many people in developing countries, mobile handsets may be the first and main access route to information and commumcation technologies (ICT), the Internet and e-commerce technologies.

The challenge is to provide access to the global telecommunications system for a significant number of citizens in developing countries. Mobile communications may be the technology that overcomes the barriers constituted by the high cost of installing fixed-line infrastructure that developing countries continue to encounter.[2]

The many facets of m-commerce, encompassing a number of dynamic and evolving services, will be examined in this chapter. It begins with a description of the main features of m-commerce. Experiences in several countries are discussed where relevant. Current m-commerce applications and trends, including banking and insurance, logistics, securities, and information services, are also reviewed. In addition, regulatory issues related to data security and privacy are assessed. Finally, the main findings and recommendations for developing country m-commerce readiness are presented.

B.   Main features of m-commerce

Wireless communications provide the long sought after platform that can make digital data transfer possible in many developing countries. This is due in part to the lower costs of mobile systems relative to fixed networks, the provision of short message services (SMS) and the enabling of wireless Internet connections. In developing countries most mobile services are prepaid using stored value cards. This mitigates post-paid subscription problems of creditworthiness and billing.

By mid-2002 there were 300 million mobile telephone users in the Asia-Pacific region. China has the largest number of mobile telephone users in the world: more than 170 million in mid-2002, with over 400 million forecast by 2005–2006.[3] Europe is an important mobile market with over 300 million subscribers forecast for 2002. The number of wireless communications has already exceeded the number of fixed-line subscribers, and it is expected that in many countries, particularly developing countries, telecommunications operators will continue to rapidly increase the number of mobile subscribers thanks to low infrastructure and operating costs. Surveys in the United States indicate that wireless services are expected to be a major vehicle for customer relationship management (CRM) and that the amount of business management and marketing activities carried out using remote communications is continuously growing.[4]

M-commerce represents the extension of e-commerce to a mobile environment. The main types of e-com-

merce – B2B, B2C, B2G and P2P–- remain. In developing countries mobile business applications, especially when used by small and medium-sized enterprises in remote areas, may become a key method for reaching potential customers, and are expected to be highly important features of m-commerce.

In 2002 worldwide m-commerce revenues are forecast to be just below $50 billion. The United States and Western Europe will dominate actual and forecast revenues through 2005. But by 2005 sales generated in the Asia-Pacific region and the rest of the world are expected to register a significant increase, approaching 40 per cent of the global $225 billion m-commerce revenues forecast. Given that global revenues in 2001 were about $20 billion and very small in regions outside North America and Europe, it is difficult to determine what the major m-commerce transactions have been. Most m-commerce is B2C where micro-purchases are involved. Larger transactions continue to be conducted using the usual e-commerce methods.[5]

The surge in mobile handset use throughout the world, the dramatic growth of the Internet, and the proliferation of PDA (personal data assistants) are expanding the e-commerce market in which m-commerce is expected to flourish.[6] A number of unique advantages of m-commerce have been identified:

- *Immediacy.* Consumers are constantly moving, working, commuting, travelling, socializing and shopping. M-commerce lets them buy goods and services as soon as the need arises.

- *Connectivity.* Users sharing a common location or interest can be instantly connected via text messaging and mobile chat capabilities. Advertisers can use such access to promote products and make special offers with the expectation that subscribers will answer and listen to their messages.

- *Localization.* With the deployment of positioning technologies, such as the global positioning system (GPS), companies can know users' whereabouts and will be able to offer goods and services specific to their location.

- *Data portability.* Users can store profiles of products, company addresses, information about restaurants and hotels, banking details, payment and credit card details, and security information, and access these when needed for purchases or for making contact, all from their mobile handsets.

Internet use has been dependent on personal computers (PCs) and a fixed-line network. And the growth of the Internet drives e-commerce. Consequently, until the advent of mobile telephone, e-commerce has been dependent on expensive infrastructure and equipment. Today, however, there is a growing convergence of the Internet and mobile communication. Handsets are acquiring functionalities that were limited to desktop PCs only a few years ago. Many are already running slimmed-down versions of PC operating systems and applications, and the difference between future handheld and desktop devices is likely to be related to the ergonomics of the physical user interface that will be designed to serve a particular purpose, rather than lack of processing power, memory or network accessibility.

The ITU reports that 225 countries and territories have dial-up Internet connections – that is, a link to the Internet through a local telephone line. In 2001 there were over 500 million Internet users, representing 8.2 per cent of the world's population. Global distribution of Internet access, however, remains dominated by developed countries, where over half of the adult population is online[7] (see chapter 1 for a detailed analysis of the Internet population). Wireless access is likely to be the principal means of bringing more people in developing countries to the Internet. For that purpose, mobile networks and handsets need to be upgraded to carry data and messaging, as well as traditional voice services. The introduction of "third generation" (3G) and Internet-enabled handsets in North America and Europe is imminent. For the rest of the world, second generation (2G and 2.5G) mobile capabilities have opened-up opportunities for narrow-band Internet access and SMS (see box 14 for standards definitions).

Box 14

Network technologies

Mobile protocols can provide a continuously increasing array of services to users.[1] The introduction of mobile communications continues to be subject to competing technical solutions. In contrast with the gradual development of fixed line telephony, these technologies are being introduced almost concurrently, even within the same country.[2] The most advanced third generation (3G) is being introduced in developed countries, whereas second generation (2G) less powerful technology is being applied in many developing countries. The following transmission technologies are likely to co-exist for some time in the future.

2G is the present widespread standard and consists of several implementations. GSM (Global System for Mobile Communications) operates in the 900 MHz and the 1,800 MHz (1,900 in the United States) frequency bands and is the prevailing standard in Europe and most of the Asia-Pacific region. The popularity of GSM provides the critical mass making it possible to develop a large variety of innovative applications and services economically. Other 2G GSM type technologies include DAMPS and PDC. In the United States, Japan and China, CDMA is an important standard.

2.5G mobile technology has been developed to provide voice and data services in parallel in order to bring data services and Internet access to mobile handsets. It also has several implementations. GPRS (General Packet Radio Service) is a packet switched wireless protocol that offers instant access to data networks. It permits burst transmission speeds of up to 115 Kbit/s when it is completely rolled out. A real advantage of GPRS is that it provides "always on" connection (i.e. continuous IP connectivity) between the mobile terminal and the network, while users only pay for data that are actually transmitted. GPRS networks are already operational in Europe and are being introduced in South-East Asia and other regions, for example South Africa. EDGE (Evolved Data GSM Environment), a more evolved protocol that offers data delivery rates of up to 384 Kbits, and GPRS are considered evolutionary steps on the path from 2G to 3G.

3G is the generic term for the formal standard IMT-2000 (International Mobile Telecommunications 2000) adopted by the ITU. The standard was devised in order to support the development of broadband wireless Internet access. Rather than establishing a technical specification, the ITU set forth criteria that implementations had to meet in order to achieve an IMT-2000 classification. There are several implementations based on IMT-2000. CDMA2000 was developed by the Third Generation Partnership Project 2 (3GPP2) consisting of five telecommunications standards bodies: ARIB and TTC in Japan, CWTS in China, TTA in the Republic of Korea and TIA in North America. CDMA Direct Spread is also known as WCDM(UMTS) and WCDM (DoCoMo) in Japan. TD-SCDMA was proposed by China Wireless Telecommunication Standards group (CWTS) and approved by the ITU in 1999. The Chinese Academy of Telecommunications Technology, in cooperation with private sector partners, developed the technology. Multiple 3G licenses have been issued in Germany, Japan, the Republic of Korea, the United States, and the United Kingdom.

Wireless Local Area Networks (WLAN), while more m-business than m-commerce, are gaining ground. Avoiding laying cable and using fixed lines can be a great advantage in a vast number of situations, ranging from business conferencing to managing very large production or construction sites. 802.11b is a WLAN implementation that is designed to substitute for wired networking and allows users to move around in buildings and remain connected. Its range is about 50 meters indoors and 500 meters outdoors. Bandwidth is specified up to 11 Mbps and decreases with range. The Bluetooth WLAN implementation allows mobile phones, computers, and personal digital assistants (PDAs) to interconnect easily with each other using a short-range wireless connection. It has a range of about 10 meters and a bandwidth of up to 3 Mbps.[3]

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1 See presentation of technologies being deployed in mobile communications, using example of China, Fan Xing, Cyber Century Forum.

2 See m-commerce, van Rooyen L. (2001)

3 Definitions were sourced from Searchnetworking.techtarget.com Definitions and Technologydecisions.com, The High Road and the Low Road, February 2002.

The goal of 3G is to enable broadband mobile Internet and data services capability. After expensive 3G licences were auctioned, mostly in Europe, telecommunication companies accumulated large debts and as a result, mobile broadband infrastructure and 3G have yet to be introduced. Many telecom operators are questioning whether customers will take-up 3G as rapidly as originally expected. The launch of 3G services has not been as successful as first forecast because potential early adopters are reasonably satisfied with pre-3G service offerings, thereby reducing the attractiveness of 3G's additional features. The situation is quite different for most developing countries. The first objective of governments and telecommunications authorities is to expand the number of subscribers for mobile telephone voice and short message services. Upgrading to 2.5G or 3G is unlikely in the near future.

The burning question for companies that have grown dependent on the Internet as a business vehicle is whether mobile telephony will result more in B2C applications than in B2B applications. It is impossible on the basis of existing experience to extrapolate what will happen in the years ahead. As regards B2B, there is little evidence that companies will change their purchasing practices because of m-commerce. The short-term potential for e-commerce growth resides with the one billion mobile telephone users, who could supplement existing B2C e-commerce with m-commerce. There is rapid growth in micropayments for small items and information services. The key to increasing traditional B2C purchases such as banking transactions and to trading in securities through m-commerce is the implementation of payment systems that are low-cost and customer-friendly

C.   Wireless in developing countries

The take-up of wireless has made progress even in relatively low-income areas, confirming yet again that communication is an essential human need. Prepaid cards allow access for people who would not qualify for a paid subscription. Mobile telephony is also helping to eliminate the seemingly endless waiting for a fixed-line subscription. With a mobile network, consumers can simply buy a handset togethere with a prepaid card and start using it as soon as the first base stations are in place. As mobile networks are often set up by private sector companies, the investment burden can shift away from the State.[8]

The extent of developing countries' involvement in m-commerce is dependent on the access and connectivity of the population to wireless communications. Providing millions of citizens in developing countries with access to wireless voice communications coupled with text messaging, and with an eventual upgrade to the Internet, is crucial to building m-commerce markets in those countries. Engaging in m-commerce, however, requires more than mobile empowerment. Initiating purchases and completing payments remains a bottleneck for m-commerce in many if not most developing countries.[9] Unless selection, ordering, payment and delivery can be managed at costs that are lower than in traditional commerce, both e- and m-commerce may face serious problems.

This may no longer be the case when m-commerce is fully utilized. Because PCs are not required, and fixed-line subscriber fees do not have to be paid, the cost of m-commerce can be relatively low. A handset may cost less than $100 and prepaid cards have become dominant. An important mobile application that can be used for commercial activities is SMS, particularly because it can exploit the existing wireless infrastructure in many developing countries. However, if there is to be true m-commerce, mobile phones must be Internet-enabled.

Mobile telephony has been taken up to a considerable extent in Asia. There are currently more than 200 million handsets in use, of which more than 120 million are enabled to use data services.[10] In Asia there is much more involvement in m-commerce. The most developed countries in the region – Japan and the Republic of Korea – have large mobile telephone populations with millions of Internet-enabled terminals. The leading developing country example of m-commerce deployment in the region is China.[11] This is not only because the country now has 170 million mobile telephone subscribers, but also because SMS has become very popular and has created a vast potential for m-commerce applications. A detailed discussion of m-commerce developments and strategies in China is presented in annex 1.

Latin America has seen a slower adoption of wireless. Even so, growth expectations are high and the Inter Market Group and Jupiter Research forecast that in 2005 there will be more than 50 million mobile Internet users in Latin America.[12]

Africa has more than 20 million mobile telephone users. By the end of 2001, 28 African nations had more mobile than fixed subscribers.[13] The number of

mobile subscribers in 30 sub-Saharan Africa countries, not including South Africa, rose from zero in 1996 to 1.7 million in late 2001.[14] Because most new African mobile subscribers have no fixed line available and very few own or can access a PC, their handset becomes their only communication device. Consequently, there is likely to be a great interest in using mobile handsets for as many applications as possible.

In the least developed countries (LDCs), mobile technology is increasing telephone access in a surprisingly short space of time. Uganda is an example of how mobile telephony has radically transformed access to communications in an LDC over a short period. As a result of the liberalization of the telecommunication sector and the low cost of installing wireless networks, the number of subscribers rose eight times from 1995 to 2000. Uganda's mobile density ranking among LDCs rose from 28th in 1997 to 8th in 2001 and today it has the third largest mobile network in the LDCs. Uganda's experience is being widely replicated in other LDCs. By the end of 2001, 24 LDCs in Africa had more mobile than fixed-line subscribers. In many countries, this transition took a little over a year: more mobile telephone users were added to the national network during that period than during the entire period of fixed-line operations.[15]

Another example is Afghanistan, where it is expected to take years to fully replace the infrastructures of electricity and fixed-line communications that have been destroyed. However, this is not the case with wireless communications: inhabitants of Kabul have obtained handsets and began using mobile services with prepaid cards in April 2002. By the end of May there were more than 2,000 handsets in use, a significant addition to the existing and inadequate 12,000 fixed lines.[16]

D.   M-commerce applications and trends

Mobile telephone customers in many developed countries are starting to use handsets to make purchases from retail stores, conduct personal banking and make travel reservations, as well as to view sports and news programmes, and search the Web (see box 15). In Germany, for example, mobile users are said to "have a moderate attitude toward many new services", yet about 25 per cent are particularly interested in m-commerce possibilities. In the United States mobile phones are often kept in family cars and used as auxiliary communication devices, rather than being carried and used continually by family members. In Europe,

the greatest interest in m-commerce seems to be in Italy whose large population of mobile telephone customers have indicated an interest in paying bills (56 per cent) and conducting banking transactions (60 per cent) via wireless devices. Mobile service providers allow both prepaid and post-paid account subscribers to register and link their cash/debit cards with mobile phone subscription accounts. This allows subscribers to conduct mobile transactions for services and goods offered through their particular mobile service provider, for example topping up of prepaid accounts and purchase of theatre tickets. Certain commercial activities using SMS, such as hotel and restaurant reservations, could eventually lead to a growth in m-commerce applications. The following discussion takes a more detailed look at several promising applications.

1.   SMS

Since 1992 SMS has allowed people to send and receive text messages using their mobile phones. Each message can contain up to 160 alphanumeric characters. SMS is the backbone of m-commerce, with the number of messages totalling billions in 2001.[17] One of the greatest concentrations of SMS users is in Singapore, where 52 per cent of phone users utilize SMS more than once a day. SMS use in Australia, China and the Philippines is reported to be almost as high. The global average, however, is 23 per cent.[18]

In December 2000, Filipinos were sending almost 50 million short messages a day, or around 9 per subscriber. The Philippines is the leader in per capita SMS usage, accounting for some 10 per cent of all short messages sent around the world. The Philippines had 8.5 million mobile telephone subscribers in June 2001. The number of mobile telephones in use exceeded the number of fixed lines in 2000; it continues to grow rapidly and is expected to reach 15 to 20 million. SMS is said to offer a practical alternative for those who do not have a computer; mobile telephone subscribers outnumber PCs in the Philipinnes by 4 to 1. A mobile short message is actually much cheaper than a telephone call. SMS was initially free. A nominal 2 cents charge was introduced in 1999. SMS accounts for a growing portion of mobile telephone revenues, since for every call made on a mobile phone, an average of 10 short messages are sent. Wireless Application Protocol (WAP) remains expensive for B2C m-commerce applications. Finally, the vast majority of Filipinos still do not have credit cards to use for online transactions or may have insufficient bank account balances to tie a debit card to direct debit.

Box 15

Survey of national B2C m-commerce market trends

Germany

- Germany has a relatively less receptive customer base. However, its sheer size within the European market makes it an important area.
- Mobile customers have moderate attitudes toward many new services. Much of current usage is personal calling by relatively light users.
- One quarter of German mobile phone owners would like to make purchases with their wireless devices, while over 30 per cent are interested in accessing video cameras at home and securing travel reservations.

Italy

- The Italian market is a high-potential area for m-commerce. The high penetration of mobile phones makes the customer base relatively large. Text messaging could capture more business.
- There is considerable interest in many mobile services: paying bills (56 per cent); paying for retail store purchases (52 per cent); banking (60 per cent) and video-mail (66 per cent).

Japan

- Japan has the most receptive customer base for m-commerce.
- The recent success of new Internet-based entertainment services has heightened receptivity.
- Close to 30 per cent of mobile users want the same capabilities on their handset as on personal computers.
- There is substantial interest in advance mobile services: having a virtual tour guide (40 per cent); purchasing inexpensive items (34 per cent); viewing news and sports (33 per cent) and face-to-face video conversations (34 per cent).

Republic of Korea

- The Republic of Korea is a developing market that appears to be poised for rapid growth in the future.
- It has one of the largest penetrations of web-enabled phones (50 per cent of all handsets), which gives this market high growth potential for broadband applications.
- 41 per cent of mobile owners use their devices some or all of the time at home, 66 per cent of the time while at work or school, and 68 per cent of the time while on vacation.
- There is solid interest in advanced mobile services: viewing real-time traffic conditions (43 per cent); accessing maps or directions (55 per cent).

United Kingdom

- The UK is a mid-level market, where future growth will require that mobile services do a superior job of delivering on promised performance and value.
- Users in the UK tend to feel slightly overwhelmed by information, and that society has become too dependent on technology.
- At the same time, there is a strong interest in m-commerce with practical applications: having face-to-face video conversations (48 per cent) and locating ATMs (60 per cent).

United States

- The US market is bimodal, having a dichotomy between heavy and light mobile users.
- The United States is an essential target for any global mobile commerce business strategy.
- Mobile users split their time 75 per cent/25 per cent between personal and business use, while over half use devices in cars.
- Interest in advance services varies: receiving short bites of entertainment (15 per cent); accessing maps and directions (50 per cent); and viewing news and sports (23 per cent)

Source: Personal Communications Industry Association/Yankelovich Global m-User Market Research.

In Hong Kong, China, wireless data traffic was underdeveloped because local mobile telecommunications operators were not eager to expand this business while revenue from voice traffic alone was growing rapidly. In December 2001, six local mobile operators announced an agreement to make their SMS interoperable and forecast significant new revenue from SMS in the years ahead.

2.   Micro-payments

M-commerce offers vast opportunities to make micro-purchases easier.[19] These can be as simple as buying from a vending machine, paying a parking meter or purchasing gasoline. Among the most widespread m-commerce applications using SMS, is making payments through post-paid accounts linked to debit cards. In the case of subscriptions to information services, the mobile service provider charges the customer through monthly bills. However, in many developing countries a shortage of consumer credit systems and the lack of automated payment systems that can be conveniently used for wireless electronic payments are hampering advancement of m-commerce. Micro-payments and settlements via wireless are growing rapidly in a number of developed countries. Estimates for 2002 are typically around $1.5 billion.[20] Forecasts for wireless micro-payments speak of $ 200 billion worldwide by 2005, with more than $ 40 billion in the United States.[21]

3.   Financial Services

A wide variety of mobile payment and settlement methods are currently used in various countries. In the Republic of Korea, mobile Internet customers prefer to integrate charges for purchases into their monthly telephone bills. Japanese often prefer to pay mobile Internet charges and usage fees in cash at convenience stores.

Prepaid value cards are widely used in Japan. However, a growing number of services, such as specialized information services, can be charged to monthly telephone bills. A new system will be introduced before the end of 2002 that uses mobile handsets with an infra-red interface that would automatically debit pre-paid cards. The cost of equipping handsets with an infra-red interface will be absorbed by savings resulting from operators and vendors not installing new vending equipment. In Japan there is great interest in this new mobile technique. Figure 4 illustrates the priorities of Japanese and Republic of Korea consumers.

Saving time, simplicity and speed of payments are the main advantages of mobile settlements. The following characteristics are listed in order of importance:

- Payments;
- Rapid payment;
- Record of payment provided;
- Less cash to carry around;
- Point-of-sale convenience;
- Signature not required.

A number of concerns still exist and demonstrate the novelty of mobile settlements and people's lack of awareness about how to take advantage of them. The main concerns are:

- Difficulty in making a payment or a financial transaction;
- Risk to the confidentiality of personal data;
- Difficulties in processing payments, including loss of payments;
- Problems stemming from the loss of a mobile device, which someone might find and use to make illegal purchases.[22]

Mobile banking is still hampered by the requirement for standardized payment cards and online systems. There has been more success with securities trading, however, where investors can buy and sell shares using their mobile handsets. Other areas are opening up – for example, insurance, where potential customers can receive offers and submit personal details for premium quotes by insurers, all with their mobile phones.

Mobile communications provides insurers with yet another way to interact with, and obtain information from, potential customers. The most immediate benefits are reducing administrative costs and bringing innovative and less expensive services to a wider market. An important facet of mobile technology will be to enable insurance agents and field representatives to provide better customer service.

Agents tend to focus on clients who they believe will take out larger policies, while the low end of sales and marketing through m-commerce has the potential to extend insurers' reach into previously underserved

segments where agent penetration is low. Buying habits are changing in that many customers want online access to product information and quotations and want to pay premiums, compare prices, access and update their policy information and claims status and receive customer service – all online.

Regarding direct insurance sales, a vast market of potential buyers could be reached through the use of mobile-based insurance marketing methods. The present level of mobile media richness and the interface quality of commercial handsets may not satisfy regulatory requirements for selling insurance products, including policy delivery and payment, in most countries. Owing to government supervision and policy complexity, mobile insurance may have to wait for 3G before making real m-commerce headway.

Mobile services include all those products provided by securities brokerage firms. Wireless technology enables customers to bypass ordering in person or by telephone, thus opening the securities market to a large number of potential buyers. In addition, brokerages supply financial information and market data to investors through their mobile handsets. This provides individual clients who have online accounts with instant access to the buying and selling of securities. However, because of poor user interface of mobile telephones and PDAs, significant mobile trading is not expected before 2005 and the full roll-out of 3G and associated handsets.

4.   Logistics

The potential of mobile communications for generating greater efficiency in transport and logistics is widely acknowledged.   The movement of goods within developing countries, as well as with regard to imports/exports, has traditionally been slow and inefficient owing to a lack of modern logistics systems. ICTs have become the key to achieving efficient logistics. Logistics costs in developed countries add about 12 per cent to the retail cost of a product, whereas in developing countries this may be as high as 20 per cent.[23]

Transport and logistics will clearly benefit from the introduction of wireless services and, in doing so, expand m-commerce. Wireless data access will make it possible to follow goods movements throughout the supply and value chain. With the growing use of information technologies in cargo booking, tracking, clearance and delivery by major shipping lines, as well as in customs clearance, ports, warehouses and stock

points, external and internal trade will become more efficient.[24]

The challenge lies in the introduction of hardware, software and networking which are costly and require technical expertise to operate. Trackability and traceability need to be ensured through interfacing technologies such as ID chips and bar codes. Mobile communications devices will then help link-up the supply chain.

Transport is typically multimodal, ranging from rail-water-air-shipping to express delivery services. The introduction of intelligent transport services further increases the value of mobile communications in the logistics supply chain, in particular for support services such as pick-up and delivery of goods.

5.   Information services

News, weather reports, and traffic and map information have increasingly become the services most sought after by mobile telephone subscribers. Since the launch of mobile services in Japan in 2000, as many as 30 per cent of all mobile customers indicate that they are users of those information services. This is three times the PC-based usage of paid information services. There is a charge by mobile service providers of about $2.50 (300 yen) per month for unlimited access to a menu of information services.[25] Over 90 per cent of mobile users in Japan access bank account data through their handsets. Figure 5 outlines the popularity of various mobile services in Japan.

Value added text messaging is the use of SMS to provide a content service or product to the consumer at a premium price. The value added to the text message by the application or the content contained therein is assumed to be above and beyond that of a standard text message and the consumer knowingly consents to be billed for that added value. In Ireland, this is known as premium text messaging. It will involve the allocation of a 5-digit short code so that consumers will understand they are accessing premium services and will be prepared to pay for them.[26] An early entrant will be mPerium, which will launch an m-payments solution using text messaging that will enable websites to charge their audience for time-metered access on their mobile telephones.[27] Other services that could be available are: event-driven content – sports alerts for a favourite team, personal investment information and alerts, industry sector news alerts, travel information such as localized real-time traffic news, and other local information.

6.   Wireless CRM Services

Customer relationship management (CRM) services usually consist of a set of methodologies, software and Internet capabilities that are coordinated and co-integrated and whose purpose is to help an enterprise manage its relationships with customers. Company activities can be very varied and may not always be managed in a coordinated way from a customer-centric point of view. The advantages for consumers of having better coordination between, say, research and development, manufacturing and after-sales services may translate for the company into marketable value-added or increased competitiveness. Much of any commercial organization's activities, including business operations and customer servicing, falls within the scope of CRM. Therefore, its large size, as shown in figure 6, is not unexpected. CRM can transform knowledge and data stored in companies by applying them, in real time, to existing and potential sales and service opportunities, in particular through access to an enterprise's data, message systems, remote sales force automation and order tracking. It has been forecast that in the United States between 35 per cent and 40 per cent of company sales and support personnel will be using mobile devices within the next two to three years.[28]

Mobile technology is starting to emerge as the newest value-added feature for CRM.[29] Extending CRM to wireless devices will enable enterprises to be more proactive in their marketing and sales by providing continuously updated information to field representatives, as well as by offering customers a broader array of contact and self-service options. Three levels of benefits are expected:

1.   Wireless CRM enables greater mobilization of the sales force, replacing periodic data synchronization with real-time information concerning products, client status, purchase history, inventory levels, product vendor information, order tracking and related data. The sales force will also have wireless financial transaction capabilities, shortening the sales cycle and increasing enterprise responsiveness.

2.   Wireless CRM facilitates a higher level of customer support by providing additional contact channels for clients seeking information or technical assistance. By extending customer data to mobile devices, the enterprise enables its support staff to better anticipate and respond to customer issues and enables customers to take advantage of self-service support and transactions via their mobile phones or PDAs.

3.   Location-based marketing will be an extension of current marketing automation and customer analysis systems. These emerging applications are expected to stimulate m-commerce by extrapolating location-specific buying behaviour to provide information to mobile device users.

7.   Other Mobile Services

M-commerce opens up a myriad of options for new electronic services. These include making appointments, voting, applications for membership or membership renewal and entitlement cards, and alarm systems. Norway provides an excellent example of this diversity of m-commerce; box 16 outlines the range of currently available services, and those soon to be available, in that country.

A survey of frequently purchased items in the Republic of Korea found buying habits similar to those in Japan. About 12 per cent of mobile subscribers indicated that their main preferences are buying movie tickets, cosmetics, banking, audio-visual and electronics products.

E.   Privacy and data protection

The need to protect personally identifiable data has received the attention of national policy-makers and international organizations for more than 30 years. With the advances in wireless communications, concerns have again arisen about loss of control over personal information. Some 40 countries have adopted national data protection laws, ranging from Canada and Argentina to Sweden and Greece, and Thailand and the Republic of Korea. Internationally, the Organisation for Economic Co-operation and Development and the Council of Europe, have adopted legal instruments for their member countries governing the collection and use of personal data.

1.   Regulatory issues

Because mobile communications services are new and operators are being licensed to compete with incumbent carriers, a number of policy and regulatory issues must be resolved. Interconnection between fixed-line operators and competing mobile operators has been the major difficulty constraining mobile development.

Box 16

M-commerce services in Norway

Telenor Mobile, the major telecommunications operator in Norway, launched its MobilHandel service in September 2001. According to recent reports, the service has become highly popular with mobile users who want to order content and services as well as pay by debiting a bank account, credit cared or mobile purse. Norway is one of the most developed mobile markets, with 450,000 citizens actively using e-commerce on the Internet. Telenor Mobile considers these users to be potential early adopters of m-commerce. The Norwegian bank DnB is the main partner on the payments side and, together with Telenor, it has developed SmartPay, the payment solution. SmartPay has introduced the first PKI secured payment solution on a SIM card and gives access to all payment methods: bank accounts, credit cards, and Smart Cash (purse).

Services currently available: Bus tickets (SAS Oslo airport shuttle); tickets to movies, football games, concerts; soda machines; purchases of goods and services from the Internet; parking fees; flowers; gambling; donations to charity organizations; ski passes; music recognition and purchase of CDs; and refilling pre-paid mobile cards.

Services soon to be available: Fast-food restaurants; carwashes; golf tees; vending machines; slot machines; petrol; travel tickets; and purchases of other goods and services.

Source: Telenor Mobile, Norway

The predominant conflicts over mobile interconnection have occurred in developed countries where several operators are seeking to gain market share. Developing countries have experienced fewer problems when national regulators have insisted on rapid deployment and fairly priced interconnection rates. Many developing countries, however, have limited geographical coverage for mobile telephone use, some operators charge both caller and receiver, and transmission standards still need to be harmonized.

A new European Community Directive that "adapts and updates existing provisions to new and foreseeable developments in electronic communications and technologies" is now replacing the existing telecommunication Directive. It is expected to be adopted before the end of 2002. The revised Directive stipulates that the location data, giving the geographical position of mobile users' terminal equipment, as in road transport services that provide traffic information and guidance for drivers, may not be used for surveillance purposes. Traffic data in general may be collected and used only with the consent of the subscriber.

It has been recognized that commercial users of wireless communications should be subject to codes of fair personal information practice, established by public law or self-regulation. The Wireless Advertising Association (WAA), an international trade group, has adopted a privacy policy that should be readily available to consumers. Under this policy WAA members should give users notice and choice regarding the use of personal information obtained. It may be used only for the purpose for which it was collected unless users explicitly consent to its being used for other purposes. Furthermore, WAA members are required to make every effort to ensure the security of personal information and, where reasonable, allow wireless subscribers to correct or delete such information.[30]

The specific provisions of the WAA privacy policy require that a member company must make known to potential recipients: (a) what information is being collected; (b) its policy on data storage; (c) the choices available to an individual regarding policy on collection of personal information; (d) the use of personal information; (e) any third-party collection of personal information, together with a statement of the organization's commitment to data security; and (f) what steps the organization takes to ensure data security and access by the consumer to his/her records.

2.   Mobile security

Concerns about e-commerce security are only heightened in the m-commerce domain. Fixed-line Internet and PC-based browser technology provides a media richness and interactivity that can be used to implement technological security and assure commercial partners that transactions are under way safely and surely. In contrast, the present-day mobile interface, be it SMS or WAP, is fairly poor and does not inspire

confidence. Furthermore, worries about data interception in the wireless medium are heightened, unlike in the case of fixed-line access, through an imperfect understanding of the technology. Finally, mobile handsets are more prone to theft and consequential misuse, particularly since they may contain passwords, keys and personal identification numbers (PINs) used to provide the authentication and data integrity required for verifying financial transactions. Security is vital if m-commerce is to become an electronic wallet for micro-payments for customers worldwide.

In addition to digital signature laws and regulations, certification authorities are being created by governments, financial institutions and other bodies, or are licensed to private entities, so that parties to e-commerce transactions can know the identity of all entities or individuals involved.[31]

To ensure m-commerce payment interoperability among devices and networks, the financial-services-backed Mobile Payment Forum was established in November 2001.[32] Initial members were Master Card International, Visa International, American Express and the Japan Card Bureau. The Forum now has 89 members. It is cooperating with the PayCircle consortium and the Mobile Electronic Transactions initiative, supported by wireless and Internet infrastructure vendors and handset manufacturers. The Forum's work should lead to secure m-commerce by migrating existing security mechanisms to the mobile environment, or by installing similar security levels for authentication, data integrity, privacy and non-repudiation. Its work covers both existing and emerging technologies, including symmetric keys and biometrics.[33]

Another organization, Radicchio, is a global initiative of over 50 companies in m-commerce and security industries that promotes m-commerce solutions based on public key infrastructure technology for personal handheld devices and wireless network. This initiative is a cross-industry non-profit organization, representing the interests of mobile operators, system integrators, hardware manufacturers, certification service providers and financial service providers, as well as software houses.

F.   Main findings and recommendations

The growth of wireless communications in less than five years has created new voice and data communications services that are essential for launching widespread business and consumer m-commerce applications.

It is becoming clear that m-commerce will not parallel earlier expansion of e-commerce. B2C transactions will be far more extensive than B2B transactions. This may be in part the result of already well-established fixed-line channels of e-commerce activities among companies. Individuals are finding it increasingly attractive to initiate B2C contacts with companies to order purchase products and services. The conduct of m-commerce is limited by difficulties in making electronic payments and concerns about security and privacy of transactions. Technology also plays an important role because mobile terminals must be Internet-enabled in order to provide full m-commerce possibilities.

There is a new dimension of m-commerce that involves introducing products and services that may not directly result in immediate transactions. In the United States, companies use mobile telephony to contact employees, conduct sales and marketing programmes and provide customer care. Enterprises in developing countries may find mobile communications very attractive for marketing in remote locations. Methods to maximize benefits from mobile business clearly require further examination.

Fundamental to a rapid expansion of m-commerce is improved access to mobile services by consumers in developing countries, for which a number of government actions are required. These involve liberalizing the telecommunications market, licensing new mobile operators, creating an independent regulatory body that will establish a fair and competitive market supporting compatible standards and facilitating the interconnection among operators. National Governments should exercise leadership in the adoption of authentication, security and data privacy policies and regulations. Improving connections to the Internet backbone remains vital.

Notes

1   Chapter 2 of the ITU's *World Telecommunications Development Report 2002* gives detailed information about developed and developing countries experiences with mobile communications. It documents the rapid growth of mobile telephony across the world in the last five years.

2   See *World Telecommunications Development Report 2002*.

3   Pyramid Research and government forecasts as reported by the Economist Intelligence Unit, November 2001.

4   The definition of m-commerce appropriately includes mobile business – companies that are introducing mobile communications for marketing, customer relations and rapid contact with sales and other staff.

5   See Accenture, "Through the Wireless Window: Where Do We Grow from Here?", 2000.

6   *Ibid.*

7   See *World Telecommunications Development Report, 2002*.

8   *Ibid.*

9   *Ibid.*

10 Cyberatlas.internet.com, "Wanted: One wireless app users simply cannot live without", 14 May 2001.

11 See Cyber Century Forum, "Scaling the Great Wall of E-Commerce: Strategic Issues and Recommended Actions", 1999.

12 Cyberatlas.internet.com, "Wireless devices continue to proliferate", 7 January 2002; Julia Scheeres, "Latin America: The mobile world", Wired.com, January 2001.

13 See *World Telecommunications Development Report, 2002*.

14 The ITU's *World Telecommunications Development Report 2002* describes, and provides statistics on the growth and importance of recently introduced mobile communications in Africa.

15 See *World Telecommunications Development Report, 2002*.

16 i.t.matters.com, May 2002, http://itmatters.com.ph/; Australian IT, July 2002, http://australianit.news.com.au/; Radio Free Europe, April 2002, http://www.rferl.org/.

17 See *World Telecommunications Development Report, 2002*.

18 See survey by management consultancy A.T. Kearney and Cambridge University's Business, "Mobinet 4", January 2002, www.atkearney.com/pdf/eng/Mobinet_4_S.pdf.

19 See Electronic Commerce Promotion Council of Japan, 'Mobile EC in Japan and User Awareness', Press release, 1 March 2002, www.ecom.or.jp/ecom_e/press/press20020301.htm

20 Mformobile.com, "How will we be paying for mobile commerce?", July 2002, www.mformobile.com/; ePpaynews.com, "Mobile Content Driving mCommerce Market", July 2002, www.epaynews.com/.

21 McGarvey R "Wireless micro-payments: Big hurdles for small change", Mbusinessdaily.com, www.mbizcentral.com/.

22 Profiles of m-commerce in Japan and the Republic of Korea are presented in the 2002 report by the Electronic Commerce Promotion Council of Japan entitled "Mobile Internet Survey Project in Japan and South Korea".

23 Estimates given in a presentation made at the Center for Information Infrastructure and Economic Development Seminar on Transport and Logistics, Beijing, China (April 19, 2002) by Ding Junfa, Executive Deputy Secretary General, Association of China Transport & Logistics.

24 UNCTAD, *Electronic Commerce and International Transport Services*, TD/B/COM.3/EM.12/2, 31 July 2001.

25 See *Mobile EC in Japan and User Awareness*.

26 See Ireland Office of the Director of Telecom Regulation, "A framework for value-added text messaging (SMS) services", ODTR 02/14, 28 January 2002, http://www.odtr.ie/docs/odtr0214.doc.

27 Cellular-news.com, "Premium SMS used to pay for internet content", February 2002.

28 See Cherry Tree & Co., "Wireless applications and professional services", November 2000, www.triple-tree.com/res_rep.htm.

29 *Ibid.*

30 The WAA is one of the first business organizations to prepare and endorse a code of conduct for m-commerce.

31 A detailed discussion of e-commerce security may be found in chapters 6 and 7 of UNCTAD's *E-Commerce and Development Report 2001* (UNCTAD/SDTE/ECB/1).

32 See "Visa, MasterCard to work together on m-commerce standards", e-commerce Times, 7 November 2001, www.ecommercetimes.com.

33 "Symmetric encryption uses the same public key for both encryption and decryption. The main problem with this approach is that the key needs to be shared by both the sender and the recipient of the electronic data. Thus, the data need to be sent separately from the key. If someone intercepts the key, they can decrypt the data. Symmetrical encryption provides confidentiality but not authentication or non-repudiation. Asymmetric encryption uses two keys, one for encryption and one for decryption, or one private key and one public key. Asymmetric encryption is ideally used in those cases where data need to be shared but the decryption key need not be sent. The public key encrypts the message, and the private key decrypts it. The public key cannot decrypt the message it encrypted, and ideally, the private key cannot be derived from the public key. Asymmetric keys provide confidentiality, authentication and non-repudiation." This explanation was given by Mark Edmead, a security management expert, at ForsearchSystemsManagement.com., at an online forum, in February 2000.

ANNEX I

China: M-commerce applications and strategies – A case study

Forecasts for mobile subscribers in China range from a conservative estimate, predicting that mobile subscribers will amount to 230 million by 2005, to optimistic predictions of over 400 million by the end of 2005, giving a penetration rate of 31 per cent.[i] Financial services may become the first to embrace significant B2C m-commerce and are described in some detail below.

Banking

Currently in China, mobile banking utilizes 2-2.5G systems, based on GSM cellular technology providing voice and narrow band data services. The Subscriber Identity Module (SIM) network architecture is composed of mobile payment made by mobile phones and mobile Point of Sale (POS) terminals.[ii] Messages are transmitted through an SMS centre where data are transferred to a banking front-end system through dedicated networks. The front-end system decodes the SMS messages and stores the data in the internal database system. After verification, a return confirmation message is sent back to the end-user (customer). In addition to not being an Internet transaction, a striking drawback of this application is that a message cannot exceed 160 characters – when the message exceeds this limit, it must be split into two message packets. When POS is used, because magnetic card transactions are generally carried out through multi-terminal co-processing, the SMS method may lead to transaction "timeouts" thereby reducing the success rate of a transaction.

The introduction of GPRS, which is now being installed by China Mobile, will provide end-to-end IP connections. GPRS' features include: theoretical transmission speeds of up to 115Kbps, always-on-network status, and data volume-based billing. This advancement will greatly facilitate expansion of both mobile terminal and POS payments. The full-range of mobile banking customer services in China and other countries that introduce similar technologies will be the following:

- Inquiry services – including account balances, transaction history analysis, banking service, information inquiries, etc;

- Transfer services – customers can perform transfers from one account to another;

- Auto-payments – customers can submit bill payments for phone services, utilities, insurance, etc;

- Personal banking – customers can make stock inquiries, securities transfers, stock trading, etc;

- Other services – such as loss of reporting and change of password, etc.

Mobile banking is mainly based on carriers offering bank-related value-added services with the SIM Tool Kit (STK)-supported SIM cards they supply to their handset customers, who can then communicate with the bank servers using the SMS platform, as described in chart 9. This technology can offer good security at low usage costs and is now the main channel for mobile banking in China. However, it also has drawbacks in that SIM cards have limited storage capacity and can only store the banking service programmes of a single bank. When time SIM storage capacity is improved and GPRS become fully introduced, customers are expected to migrate to the high-capacity STK-GPRS.

Chart 9
Transmission of message from mobile phone to bank
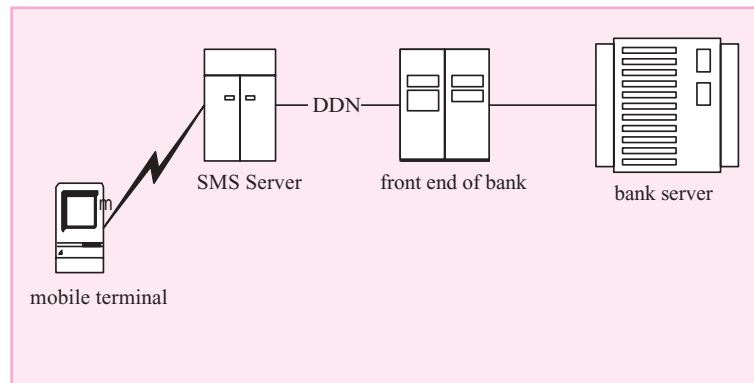
Source: China Agricultural Bank.

A customer uses a mobile telephone menu to enter messages.[iii] The SIM card then encrypts the message and transmits to the SMS Center, which identifies the destination of the IP address on the message header and uses DDN to transmit the massage to the bank's front end system. The front-end system then decrypts the message for verification and transforms the message into a data format recognizable to the internal computer system. The data are then processed by the bank's main system and a response message is sent to the customer's terminal via the original path.

Chart 10
Mobile POS terminal transactions using bank cards
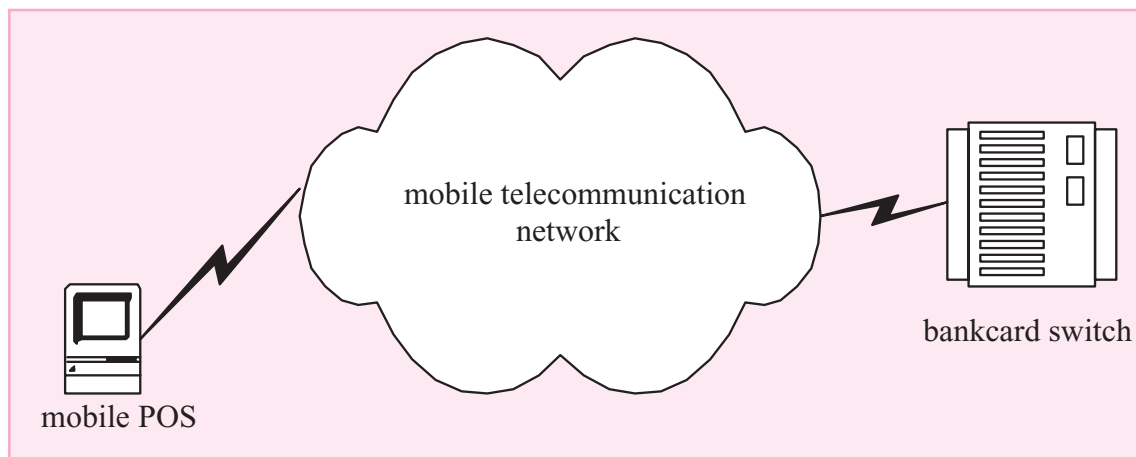
Source: China Agricultural Bank.

After a cardholder swipes his card through the POS terminal, a transaction message is transmitted to the banking card exchange network. After the card-issuing company has completed verification, a return message is transmitted back to the POS terminal and the transaction is complete.

Both enterprises and consumers in China have demonstrated a strong interest in banking cards – mostly debit or other forms of pre-paid cards. There are now more than 360 million banking cards issued, but most are rarely used. This is in part because China's banking regulations have prohibited establishing countrywide bankcard systems. However, this is being changed, and countrywide transactions will become possible in the near future. Interbank

networks or standardized formats presently do not exist for using bankcards in POS terminals across China. The People's Bank of China is actively engaged in improving this situation, and a commission composed of representatives of all Chinese banks as well as major foreign card-issuing companies, including American Express, VISA and MasterCard, will be addressing these issues.

The wider deployment of POS terminals is also necessary in China so that more extensive consumer and commercial applications can be realized. In the future, applications may be expanded to include industrial, taxation and insurance sectors. The POS system also will have great prospects in the tourism, car rental, retailing and take-away service markets. The China Banking Card Center for Mobile POS Systems described in chart 10 is presently being designed and will provide:

- Reliability – guaranteeing during system operation that services are correctly processed without unpredictable errors, with a comprehensive monitoring system that ensures prompt handling of system problems;

- Security – encryption throughout the entire transmission, with series of verifications of both the terminals and the operator, in order to ensure that passwords are not easily disclosed and messages altered during transmission;

- Technological sophistication – using advanced mobile communication technologies, mobile terminals and bank-end systems will ensure a satisfactory transaction success rate;

- Open platform – ensuring the compatibility with the system of all vendors and service providers.

Insurance

In China, the Pingan Insurance Company is anticipating that, of the 20 per cent of Internet users who say they plan to purchase insurance online, a significant percentage will obtain information on policies via mobile handsets.[iv] Using SMS and later 2.5G mobile technologies, Pingan is anticipating the greatest demand in China by individuals will be motor vehicle, health, vehicle and family property insurance.

For automobile insurance, smaller local companies in China are beginning to apply mobile technology. HuaAn Insurance and Shenzhen DiDou Technology Company have partnered to develop an automobile insurance integrated services system that uses GPS technology to allow customers to prevent auto theft and perform digital management.

Securities trading

In China, the securities services market can be divided into securities trading and securities information services. The former focus on transaction fulfillment and the latter provide various information services relevant to the trading of financial instruments.

At the end of 2000 there were 58 million off-line investment accounts (95 per cent being individuals) in Shanghai and Shenzhen alone. Today many brokerage houses have begun to offer mobile securities services to their securities investment customers. However, mobile trading has not progressed as rapidly as mobile information services. A report by the China Securities Regulatory Commission indicates that most, nearly 90 per cent of Chinese investors cannot often visit brokerage outlets to monitor markets and trade, and most people cannot access the Internet at work to get market information and perform transactions. Among the three million online investors in China, nearly 90 per cent have expressed interest in utilizing mobile securities trading.[vi]

Chart 11
Mobile securities service value chain
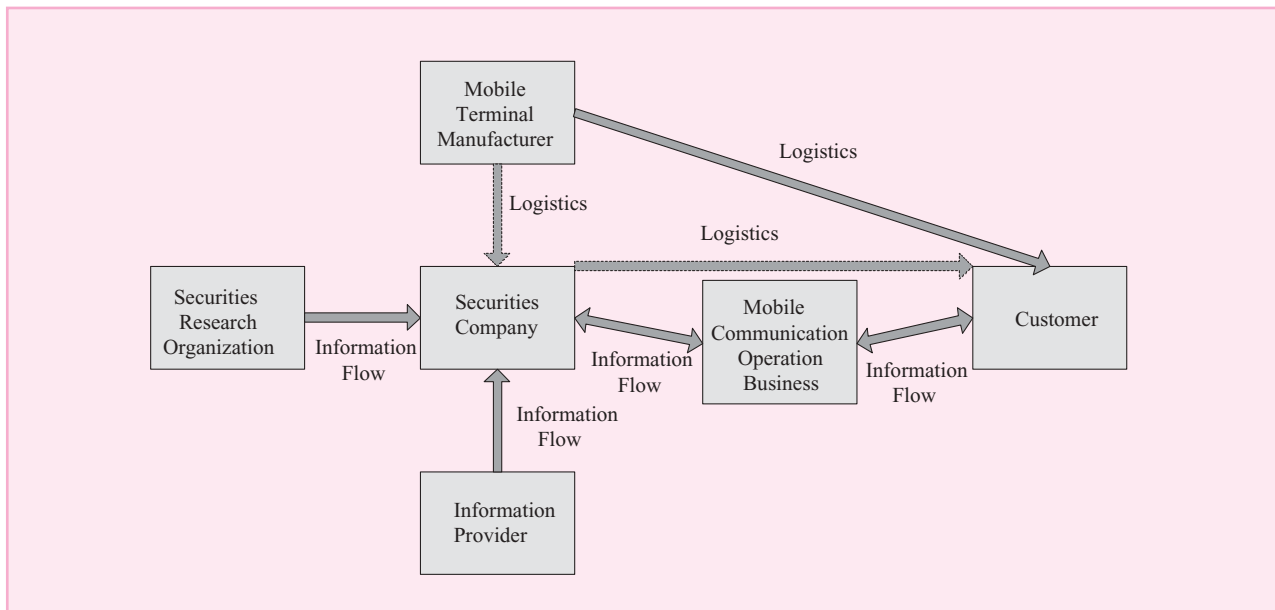
Source: China Securities Regulatory Commission.

At time of writing, 724 Solutions and Bank of America (Asia) were offering Wireless Securities Trading Services in Hong Kong. These services will allow customers of Bank of America (Asia) to access real-time wireless stock trading, quotes and other brokerage services with various Internet-enabled mobile devices such as WAP mobile phones and PDAs. With no restrictions on network carrier, customers can perform trading functions anywhere and at any time using the Internet-enabled mobile device of their choice. Signing up for the services is done by setting up a customer ID and PIN via the Internet, while access is through a secure, end-to-end connection with the bank's WAP site.[vii] Another example is the intermediation of Hong-Kong-based mobile operator 1010, which is providing mobile access to banking services, including securities trading, for clients of six local banks.[viii]

i Economist Intelligence Unit, November 2001.

ii See description of China's developments in mobile banking, Su, S., Agricultural Bank of China.

iii See Su, S. (2001) for detailed description of China's advancement in bank payments.

iv See Zhan, L. (2001) for a description of mobile technology in the insurance industry of China.

v See Hou, H. (2001), paper on Wireless Financial Trading Applications for China.

vi See Hou, H. (2001), paper on Wireless Financial Trading Applications for China.

vii 724.com, May 2002.

viii http://www.csl1010.com/personal_en/vas/va_mbs.jsp.